Supreme Court, U. S.
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IN THE

Supreme Court of the United States

OCTOBER TERM, 1979

No. 79-1478

ELLIPSE CORPORATION,

Petitioner,

vs.

FORD MOTOR COMPANY,

Respondent.

APPENDIX TO PETITION FOR A WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE SEVENTH CIRCUIT

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March 20, 1980

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APPENDIX

Unpublished Order Not To Be Cited Per Circuit Rule 35

UNITED STATES COURT OF APPEALS
For the Seventh Circuit
Chicago, Illinois 60604

Argued: November 27, 1979, December 21, 1979.

Before

Hon. Thomas E. Fairchild, *Chief Judge*
Hon. John Minor Wisdom, *Senior Circuit Judge**
Hon. Robert A. Sprecher, *Circuit Judge*

Ellipse Corporation, *Plaintiff-Appellant, Cross-Appellee,* Nos. 79-1053 and 79-1054 *vs.* Ford Motor Company, *Defendant-Appellee, Cross-Appellant,*	Appeals from the United States District Court for the Northern District of Illinois, Eastern Division. — No. 66 C 1421 — Joseph Sam Perry, *Judge.*

and

Ellipse Corporation, *Plaintiff-Appellant, Cross-Appellee,* Maurice Rosenfield, *Proposed Intervenor-Appellant,* Nos. 79-1177 and 79-1178 *vs.* Ford Motor Company, *Defendant-Appellee.*	Appeals from the United States District Court for the Northern District of Illinois, Eastern Division. — No. 66 C 1421 — Joseph Sam Perry, *Judge.*

* Honorable John M. Wisdom of the United States Court of Appeals for the Fifth Circuit, is sitting by designation.

ORDER

This appeal and cross appeal are from an accounting of damages by reason of the infringement by the defendant Ford Motor Company of Claim 3 of patent No. 2,628,568, the pumping element of a high pressure pump for fluids used in the power steering element of defendant's automobiles. The patent was issued to Marvin L. Rhine and was owned by the plaintiff Ellipse Corporation, which was incorporated in 1945, produced 8 to 12 pumps, abandoned its manufacturing operations in 1948, and became a dormant corporation except for selling two pumps in 1956.

The action for infringement, commenced on August 2, 1966, resulted in a judgment that Claims 1 and 3 were valid and infringed. See *Ellipse Corp.* v. *Ford Motor Co.*, 312 F. Supp. 646, 662 (N. D. Ill. 1969). On appeal, the finding of infringement of Claim 1 was reversed, but the judgment of validity and infringement of Claim 3 was affirmed. See *Ellipse Corp.* v. *Ford Motor Co.*, 452 F. 2d 163, 172 (7th Cir. 1971), *cert. denied*, 406 U. S. 948 (1972).

Upon remand for an accounting, the court appointed a special master, who conducted some 250 trial sessions producing 231 volumes of transcript totalling over 19,500 pages. When the special master became ill and underwent surgery and after he had closed proofs, the district court relieved him of his duties and undertook the case personally. Neither party objected to that procedure. The parties were ordered to resubmit all of their exhibits and to reargue their admissibility and were given the opportunity to present additional evidence before the court; the court reviewed the entire record of the proceedings before the special master, considered briefs filed by the parties, together with proposed findings and conclusions, and heard oral argument. The district court's judgment as to damages, as well as his findings and conclusions, were entered on November 8, 1978. See *Ellipse Corp.* v. *Ford Motor Co.*, 461 F. Supp. 1354 (N. D. Ill. 1978).

Although, upon appeal, the plaintiff has complained of this procedure, it has raised no issues which depend upon the credibility of the witnesses. For this reason and because of plaintiff's failure to object in timely fashion, we find no merit in plaintiff's argument of this issue. *W. R. B. Corp.* v. *Geer*, 313 F. 2d 750, 752-53 (5th Cir. 1963), *cert. denied*, 379 U. S. 841 (1964); *D. M. W. Contracting Co.* v. *Stolz*, 158 F. 2d 405, 407 (D. C. Cir. 1946), *cert. denied*, 330 U. S. 839 (1947).

The plaintiff's principal objections on appeal center around the court's findings that the plaintiff is entitled to a reasonable royalty of 10 cents per pump upon 6,568,203 pumps used by the defendant from August 2, 1966 to February 17, 1970, or total damages of $656,820.30.

Although both parties agree that the cut-off date is February 17, 1970, the date of the expiration of the Rhine patent, the plaintiff contends that the royalty should be computed from August, 1964, the first use by the defendant in model year 1965, whereas the defendant argues, and the trial court agreed, that the opening date should be August 2, 1966, the commencement of the infringement action. The court found that the plaintiff marketed two pumps in 1956 which were sold to the defendant without notice of the patent and that plaintiff gave defendant no other notice of infringement until the infringement suit was filed. In view of 35 U. S. C. § 287[1] and the findings, the court

1. 35 U. S. C. § 287 provides:

> Patentees, and persons making or selling any patented article for or under them, may give notice to the public that the same is patented, either by fixing thereon the word "patent" or the abbreviation "pat.", together with the number of the patent, or, when, from the character of the article, this can not be done, by fixing to it, or to the package wherein one or more of them is contained, a label containing a like notice. In the event of failure so to mark, no damages shall be recovered by the patentee in any action for infringement, except on proof that the infringer was notified of the infringement and continued to infringe thereafter, in which event damages may be recovered only for infringement occurring after such notice. Filing of an action for infringement shall constitute such notice.

was correct in beginning the royalty computation with the first notice, that is, filing the lawsuit. *Union Carbide Corp.* v. *Grover Tank & Mfg. Co., Inc.*, 282 F. 2d 653, 675-76 (7th Cir. 1960), *cert. denied*, 365 U. S. 812 (1961).[2]

Plaintiff believes that a royalty of 10 cents per pump is too low and defendant on cross appeal believes that it is too high.

The statute provides that the claimant be awarded "a reasonable royalty for the use made of the invention by the infringer," 35 U. S. C. § 284,[3] in situations where the claimant has not itself substantially sold the product and hence is unable to show damages in the form of lost sales and profits. *Zegers* v. *Zegers, Inc.*, 458 F. 2d 726, 730 (7th Cir. 1972), *cert. denied*, 409 U. S. 878 (1972). What is a reasonable royalty recoverable by a patentee where actual damages are not proved is a question of fact and the district court's determination must be upheld unless clearly erroneous. *Hughes Tool Co.* v. *G. W. Murphy Industries, Inc.*, 491 F. 2d 923, 930 (5th Cir. 1973).

The court carefully and in explicit detail recostructed the situation prior to the infringement to determine a reasonable royalty "which would be accepted by a prudent licensee who wished to obtain a license but was not so compelled and a prudent patentee, who wished to grant a license but was not so compelled." *Horvath* v. *McCord Radiator & Mfg. Co.*, 100 F. 2d

2. Plaintiff has also complained that the number of pumps is not correct but this is the number which the plaintiff stipulated to be correct for the time period involved.

3. 35 U. S. C. § 284 provides as follows:

> Upon finding for the claimant the court shall award the claimant damages adequate to compensate for the infringement, but in no event less than a reasonable royalty for the use made of the invention by the infringer, together with interest and costs as fixed by the court.
>
> When the damages are not found by a jury, the court shall assess them. In either event the court may increase the damages up to three times the amount found or assessed.
>
> The court may receive expert testimony as an aid to the determination of damages or of what royalty would be reasonable under the circumstances.

326, 335 (6th Cir. 1938), *cert. denied*, 308 U. S. 581 (1939). The "willing buyer—willing seller" rule "contemplates a supposititious meeting in advance of infringement between patent owner and potential infringer in order to work out a license agreement." *Georgia-Pacific Corp.* v. *U. S. Plywood-Champion Papers, Inc.*, 446 F. 2d 295, 296-97 (2d Cir. 1971), *cert. denied*, 404 U. S. 870 (1971).

The district court considered, among many other things, that the pumping element of the defendant's pump (the only portion covered by the Rhine patent) cost about $2.50; that the defendant could have originally purchased an almost equivalent pump for 9 cents more through General Motors; that defendant was able to manufacture the infringing pump for a "few pennies" less than alternative pumps then available; that defendant's customers do not purchase Ford automobiles based on the particular pump used in the power steering systems; that defendant was paying less than 1% for royalties on high volume items to be used in its automobiles; that the plaintiff had no facilities or employees, its only asset being the Rhine patent; that no one had ever obtained or requested a license from plaintiff, and it had absolutely no bargaining power other than the patent; that in the automotive field a royalty is usually expressed as a lump sum or a fixed amount per unit; that in the case of other automobile component parts the defendant had paid or was paying 4/10%, 1/10%, 5/10%, 45/100%, 12/100%, and 5/10%; that other pump royalties paid by others were 7 7/10 cents and 8 1/2 cents per unit; and other criteria.

The defendant argues that, contrary to the district court's finding of a reasonable royalty of 10 cents per pump, this criteria should result in a royalty of about 2½ cents per pump, or about $150,000 total. The plaintiff argues that a reasonable royalty is $5.79 per pump, or a total amount with interest of almost $100 million. We have carefully examined the district court's findings and conclusions, 461 F. Supp. 1354, and such portions of the record to which the findings and counsel for both

parties have led us, and we conclude that the district court's findings and conclusion that 10 cents per pump is a reasonable royalty is not clearly erroneous.

The plaintiff complains that the district court provided for interest from the date of the judgment only and not from the end of each year in which infringement occurred on the amount of damages incurred in that year. This circuit assesses interest only from the date damages are liquidated, absent exceptional circumstances. *Wahl* v. *Carrier Mfg. Co., Inc.*, 511 F. 2d 209, 215 (7th Cir. 1975). Exceptional circumstances such as to allow recovery of interest for periods before such damages are liquidated require a clear showing of bad faith or fraud which would constitute gross injustice if not remedied. *Columbia Broadcasting System, Inc.* v. *Zenith Radio Corp.*, 537 F. 2d 896, 897 (7th Cir. 1976). In the previous appeal of this case, we held that exceptional circumstances are not present here. See *Ellipse Corp.* v. *Ford Motor Co.*, 452 F. 2d 163, 172 (7th Cir. 1971). Prejudgment interest was not warranted.

The plaintiff has also argued that the trial judge erred in entering in the judgment the provisions that "[e]ach of the parties shall bear its own costs of this accounting and the parties shall share equally both the transcript costs and Special Master's fees and costs." 461 F. Supp. at 1381.

35 U. S. C. § 284 provides that the court shall award infringement damages "together with interest and costs as fixed by the court." See note 3, *supra*.[4] Rule 53(a) of Fed. Rev. Civ. P. provides that "[t]he compensation to be allowed to a master shall be fixed by the court, and shall be charged upon such of the parties . . . as the court may direct."

The plaintiff has noted that the reasons given by the trial court for requiring each party to bear its own costs were: (1) the plaintiff offered extensive testimony and a voluminous number

4. Rule 54(d) of Fed.R. Civ. P. provides that "costs shall be allowed as of course to the prevailing party unless the court otherwise directs. . . ."

of exhibits in contending for its theory that an award should be based upon the defendant's profits rather than the plaintiff's damages; (2) the plaintiff abandoned some of its charges against the defendant on the eve of the liability trial; (3) upon the earlier appeal, this court reversed the findings for the plaintiff in part; (4) the plaintiff offered an excessive amount of irrelevant evidence in the accounting trial; (5) the plaintiff needlessly prolonged the litigation and added to the expense of the accounting; and (6) it would be inequitable to assess the entire cost of the accounting against the defendant. See 461 F. Supp. at 1377. Our examination of the portions of the record which the parties have identified for us leads us to conclude that the district court did not abuse his discretion in apportioning the costs and master's fee.

We have considered all of the issues raised by the appeal and cross appeal and by the appeals of Maurice Rosenfield[5] and affirm the judgment entered by the district court.

5. A shareholder of the plaintiff corporation.

Unpublished Per Curiam Order

UNITED STATES COURT OF APPEALS

For the Seventh Circuit

Chicago, Illinois 60604

December 21, 1979

Before

Hon. Thomas E. Fairchild, *Chief Judge*
Hon. John Minor Wisdom, *Senior Circuit Judge**
Hon. Robert A. Sprecher, *Circuit Judge*

Ellipse Corporation,
Plaintiff-Appellant, Cross-Appellee,

Nos. 79-1053 and 79-1054 *vs.*

Ford Motor Company,
Defendant-Appellee, Cross-Appellant,

Appeals from the United States District Court for the Northern District of Illinois, Eastern Division.

No. 66 C 1421

Joseph Sam Perry, *Judge.*

and

Ellipse Corporation,
Plaintiff-Appellant, Cross-Appellee,

Maurice Rosenfield,
Proposed Intervenor-Appellant

Nos. 79-1177 and 79-1178 *vs.*

Ford Motor Company,
Defendant-Appellee.

Appeals from the United States District Court for the Northern District of Illinois, Eastern Division.

No. 66 C 1421

Joseph Sam Perry, *Judge.*

* Honorable John M. Wisdom of the United States Court of Appeals for the Fifth Circuit, is sitting by designation.

PER CURIAM ORDER

This cause came on to be heard on the transcript of the record from the United States District Court for the Northern District of Illinois, Eastern Division, and was argued by counsel.

On consideration whereof, it is ordered and adjudged by this court that the judgment of the said District Court in this cause appealed from be, and the same is hereby, AFFIRMED, in accordance with the order of this court entered this date. Each party to bear its own costs.

UNITED STATES COURT OF APPEALS

For the Seventh Circuit

Chicago, Illinois 60604

January 18, 1980

Before

Hon. Thomas E. Fairchild, *Chief Judge*

Hon. Robert A. Sprecher, *Circuit Judge*

Ellipse Corporation,
Plaintiff-Appellant, Cross-Appellee,

Nos. 79-1053 and 79-1054 *vs.*

Ford Motor Company,
Defendant-Appellee, Cross-Appellant,

and

Ellipse Corporation,
Plaintiff-Appellant, Cross-Appellee,

Maurice Rosenfield,
Proposed Intervenor-Appellant,

Nos. 79-1177 and 79-1178 *vs.*

Ford Motor Company,
Defendant-Appellee.

Appeals from the United States District Court for the Northern District of Illinois, Eastern Division.

No. 66 C 1421

Joseph Sam Perry,
Judge.

Appeals from the United States District Court for the Northern District of Illinois, Eastern Division.

No. 66 C 1421

Joseph Sam Perry,
Judge.

This matter comes before the court for its consideration on the receipt herein copies of a letter, written by the President of Ellipse Corporation, and addressed to each member of the panel in these consolidated appeals. It does not appear that copies of this letter were served on opposing counsel.

This letter is apparently intended to serve as a petition for rehearing and as a motion for a stay of this court's mandates. As so treated,

It Is Ordered that this petition for rehearing is hereby DENIED.

It Is Further Ordered that the motion for a stay of this court's mandates is hereby DENIED.

Ellipse Corporation, Plaintiff,

v.

Ford Motor Company, Defendant.

No. 66 C 1421.

United States District Court,
N. D. Illinois, E. D.

Nov. 8, 1979.

FINDINGS OF FACT AND CONCLUSIONS OF LAW

PERRY, *Senior District Judge.*

Findings of Fact

1. This matter is before the Court for an accounting of damages to be awarded, pursuant to 35 U. S. C. 284[1], to Ellipse Corporation (hereinatfer "Ellipse") by reason of the infringement by Ford Motor Company ("Ford") of Claim 3 of a patent No. 2,628,568, entitled "High Pressure Pump", issued to Marvin L. Rhine ("the Rhine patent").

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1. 35 U. S. C. § 284 provides in pertinent part:

"Upon finding for the claimant the Court shall award the claimant damages adequate to compensate for the infringement, but in no event less than a reasonable royalty for the use made of the invention by the infringer, together with interest and costs as fixed by the court.

* * * * *

The court may receive expert testimony as an aid to the determination of damages or of what royalty would be reasonable under the circumstances."

History of the Case

2. This action was commenced on August 2, 1966, Ellipse charging in its complaint that Ford's two-speed, automatic transmission pump and Ford's power steering pump ("the F-T pump") both infringed Claims 1 and 3 of the Rhine patent. Subsequently, Ellipse abandoned the charge against Ford's transmission pumps. After a trial on the merits, this court held Claims 1 and 3 valid and infringed by Ford's power steering pump. 312 F. Supp. 646 (1969).

On appeal, the finding of infringement of Claim 1 was set aside, but the court's judgment as to validity and infringement of Claim 3 was affirmed. 452 F. 2d 163 (7th Cir. 1971), *reh. denied* December 13, 1971; *cert. denied,* 406 U. S. 948, 92 S. Ct. 2041, 32 L. Ed. 2d 337, *reh. denied,* 409 U. S. 898, 93 S. St. 99, 34 L. Ed. 2d 157 (1972). Thereafter, the case was remanded to the District Court for an accounting to determine the damages to which Ellipse is entitled.

For the purpose of taking such accounting and determining the damages, the court appointed David J. Shipman, Esq. as a Special Master in Chancery to supervise discovery, take and hear testimony of the parties and to thereafter make a written report to the court on the accounting and a recommendation as to the final amount of money judgment to be included in a final decree.

3. Proceedings before the Special Master commenced with a pretrial conference on June 22, 1972. After more than two years of pretrial proceedings, including a series of discovery depositions attended by the Special Master, the court ordered all discovery to be concluded and trial to commence. Trial started on January 22, 1975. Hearings were held several days each month with periodic recesses of approximately six to eight weeks. Shortly after defendant Ford started presenting its evidence in mid-1976, its trial counsel, George N. Hibben, fell seriously ill and died. Later, when trial resumed, the Special

Master became ill and underwent surgery. Ultimately, proofs were declared closed on May 17, 1978.

By an order entered on May 19, 1978, the original order of reference was modified; the court waived the filing by the Special Master of a written report containing his recommendations as to the final amount of the money judgment to be included in a decree and counsel for the parties were directed to submit their briefs and proposed findings directly to the court.

The court has reviewed the entire record of the proceedings before the Special Master, considered the briefs filed by the parties, together with their proposed findings of fact and conclusions of law, and has had the opportunity to hear oral argument presented by counsel.

The Rhine Patent

4. The Rhine patent discloses a high pressure pump for fluids. It is concerned with the nature and shape of the pump's stator, its rotor and the blades (or slippers) that are driven along the stator cavity by the rotating rotor. (Findings 16)[2]. This combination of a stator, rotor and blades comprises what has been referred to in this proceeding as the pumping element portion of the pump. (Tr. 11285, 12733) Other parts of a complete pump assembly include the shaft, housing, and plates,

2. Abbreviations used herein are:

"Tr. . . . ."	—The accounting trial transcript.
"PAX"	—Plaintiff's accounting exhibit.
"DAX"	—Defendant's accounting exhibit.
"App. . . . ."	—The appendix on appeal in the liability phase.
"T&C"	—Transmission & Chassis Division of Ford Motor Co.
"TRW"	—TRW, Inc., previously Thompson Ramo Woolridge, Inc.
"F-T pump"	—The pump that is the subject of this accounting, sometimes referred to as the Thompson pump.
"Findings"	—Findings of the court in the liability trial.
"Master"	—David J. Shipman, Special Master appointed for the purpose of taking the accounting.

reservoir and flow control valve. (DAX 113, pp. 24-27, Tr. 11619-21). Claim 3, the only claim found to be infringed, is limited to the pumping element combination, i.e., the stator, rotor and blades.

Claim 3 provides:

"A rotary fluid displacement device comprising a stator having an out-of-round stator cavity, a rotor located therein, said rotor having blade-receiving pockets, a blade received in each of said pockets, each of said blades having contact at all times during the operation with said stator and said rotor, in which the contact between the outer surface of the blade and the inner surface of the stator is area contact to prevent complete rotation of the blade in the pocket but permit it to rock therein with free movement in relation to said pocket, and the contact of a side of the blade with the rotor pocket being along a line which varies in position with respect to the blade and the pocket during operation and which acts as a pivot for the blade, the pivot action tending to keep the outer surface of the blade in said area contact with said stator during all positions of rotation of said rotor."

The patentable distinction of the pumping element disclosed in Figure 7 of the Rhine patent, and claimed in Claim 3, was described by the Court of Appeals as the special relationship of the slippers to the stator whereby a "mismatching area contact" was achieved. 452 F. 2d 163, 170. By its earlier decision this court has determined that the pumping element of the F-T pump does employe such "mismatching area contact".

The Parties

5. Ellipse was formed in 1945 by Simon Moss and the inventor, Marvin Rhine, to develop and promote the pump that is the subject of the Rhine patent. Ellipse's business of attempting to make and sell slipper pumps of both balanced and unbalanced design was carried out during 1946-48 (DAX-8-34).

The business did not prosper. Neither Mr. Moss nor Mr. Rhine had either the education or the ability to properly organize and operate a manufacturing facility (Finding 6). In all, Ellipse produced a total of approximately 8 to 12 pumps (App. pages 170, 1399).

Unable to commercialize the Rhine pump, Ellipse abandoned its manufacturing operations and sold its equipment in 1948. With the exception of two pumps it sold in 1956 (DAX-7, 35-37), Ellipse has been a dormant shell corporation since 1948. Its sole asset has been the Rhine patent. The inventor, Mr. Rhine, died in 1959. Up to 1966, the stock in Ellipse was distributed among Simon Moss, his brother, Harvey, Marvin Rhine and after Mr. Rhine's death, his widow, Bess. On January 7, 1966, after Ellipse had decided to sue Ford for infringement of the Rhine patent, Mr. Moss purchased Mrs. Rhine's ⅓ interest in Ellipse (represented by 100 shares of stock) for $3,000 (DAX-166). At about the same time Norman Lettvin, plaintiff's trial counsel, purchased a 25% stock interest in Ellipse and Maurice Rosenfield, another attorney in Chicago associated with Ellipse, purchased a 39% stock interest in Ellipse. As a result of these transactions, the two lawyers obtained a controlling 64% interest in Ellipse. (DAX-182). Since 1966, the two lawyers, together with Mr. Moss have formed the Board of Directors of Ellipse (DAX-148) and Mr. Rosenfield has controlled Ellipse's finances. (DAX-183, 184). Mr. Lettvin filed this suit and has tried the case in all proceedings in the District Court, the Court of Appeals and the Supreme Court; before the Special Master David J. Shipman; and before the District Court thereafter through final argument. He has at all times been in constant contact with Mr. Rosenfield for consultations.

Ford is a well-known marketer of automobiles. Among the various options that Ford offers for use with its automobiles is a power steering system. Commencing with its 1965 model year vehicles. Ford began using the F-T pump in its power steering systems. (Finding 11). That pump was designed by TRW,

Inc. ("TRW"). (PAX-137, p. 266). Under an agreement with TRW, Ford's Transmission and Chassis Division ("T&C") manufactured approximately 65% of the F-T pumps used by Ford and TRW supplied Ford the remaining 35% of those pumps.

The Relevant Period of Accounting

6. The parties are in disagreement as to the relevant period of accounting. Plaintiff maintains that all of the F-T pumps used by Ford from 1964 (when the 1965 model year vehicles were introduced) up to February 17, 1970, the expiration of the Rhine patent, are subject to this accounting. Relying on 35 U. S. C. § 287, defendant contends that it should be required to account only for those F-T pumps it used from August 2, 1966, the date this action was filed, up to the expiration of the Rhine patent. The parties have stipulated that Ford used 9,098,945 F-T pumps during the period contended for by plaintiff, and 6,568,203 F-T pumps during the period contended for by the defendant.

Relying on DAX-82 and the testimony of Mr. Closser, plaintiff contends there are an additional 482,548 "remanufactured" pumps that should be included in the accounting. This contention is inconsistent with plaintiff's stipulation on February 22, 1977 that the number of remanufactured pumps is unknown. Nonethless, the court has reviewed DAX-82 and the testimony of Mr. Closser, but finds no basis for altering the stipulation. Plaintiff was aware of this exhibit and Mr. Closser's testimony when it entered into the stipulation. The units listed in DAX-82 are defective pumps remanufactured and sold by independent companies, not by Ford. (Tr. 9305-09)

[1] Based on the evidence in this case, it is concluded that Ford's contention as to the relevant period of accounting is correct. In 1956, Ellipse had two fuel pumps made by an outside engineering firm which it then sold to Ford. (DAX-7, 35-37).

[2] Both Ellipse's president (App. p. 1453) and its patent counsel (DAX-38) have asserted that those fuel pumps were produced in accordance with the invention in the Rhine patent. However, Ellipse has offered no proof that those pumps were marked with the number of the Rhine patent. Under 35 U. S. C. § 287, the failure of a patent holder to mark its own product with the patent number limits the recovery of damages to the period subsequent to notification of infringement. It is clear that Ford was given no notification prior to the institution of this action on August 2, 1966.

Ellipse did send a notice of infringement to Ford by letter dated December 21, 1962 (DAX-38). The letter did not specify any particular pump believed by Ellipse to be infringing; however, the evidence is clear that the letter was intended to refer to Ford's two speed automatic transmission pump. (PAX-90-C; Tr. 18704). Plaintiff now concedes that the transmission pump did not infringe the Rhine patent. (Finding 10).

Ellipse contends that under *Wine Railway Appliance Co.* v. *Enterprise Railway Eqt. Co.*, 297 U. S. 387, 56 S. Ct. 528, 80 L. Ed. 736 (1936), the provisions of 35 U. S. C. § 287 do not apply to it since it was not a marketer of pumps. However, the facts are otherwise and *Wine Railway* is not controlling here. Ellipse did market two pumps which, by its own admission, came under the Rhine patent and it has presented no evidence that it marked them in accordance with the statute.

The evidence also demonstrates that Ellipse had ample opportunity to give Ford notice had it elected to do so. Ellipse purchased an F-T pump in 1965. (Tr. 18803-07). By early January, 1966, the pump had been analyzed and the decision to sue Ford had been made. (Tr. 18810, 18811-12). Mr. Moss has testified that at least six lawyers were associated with the company in connection with this suit. (Tr. 18808-09). Yet, neither Ellipse nor any of its lawyers made any effort to notify Ford that the F-T pump was believed to be an infringement. Having withheld such notice, when it plainly could have been

given, Ellipse cannot now escape the consequences of its actions. *Union Carbide Corp.* v. *Graver Tank & Mfg. Co.*, 282 F. 2d 653, 676 (7th Cir. 1960). Ford is responsible to account only for the pumps it used from August 2, 1966 to February 17, 1970.

The Applicable Measure of Recovery

7. Ellipse has never been a competitor either of Ford or of its supplier, TRW. It asserts no lost sales, lost profits or any other competitive injury as a result of the infringement. Yet, plaintiff contends that its recovery is to be based on the profits Ford realized on its "sale" of F-T pumps as a part of a power steering option. Recognizing that Ford only uses the F-T pump as a part of the power steering system in its car and, hence, there is no identifiable "revenue" or "profit" for the pump. Ellipse has undertaken, by a method of cost ratios, to apportion a profit to the pump. From this apportioned profit, plaintiff deducts an amount which it designates as Ford's "usual" profit, the remainder or "excess" profit being claimed as a reasonable royalty.

In its post-trial brief, plaintiff sets out four computations, each premised on a theory of profit apportionment. Based on those computations, plaintiff maintains that a reasonable royalty, on a pump worth approximately $10, ranges from $4.76 to $6.51 per pump. Plaintiff has also presented a fifth method of computation in which it apportions profit to the pump and claims 50% of that profit as a reasonable royalty. Under this approach, plaintiff claims a royalty of $3,44 per pump. Plaintiff has in its computations averaged out and proposed that the court should award to plaintiff the amount of $5.79 of Ford's "profit" on each of the pumps used by Ford and on each of the pumps rebuilt or remanufactured.

In its proposed Findings of Fact and Conclusions of Law delivered to the court, Ellipse has also included various computations of "reasonable royalty". It maintains that all of the F-T

pumps used by Ford from 1964 (when the 1965 model year vehicles were introduced) up to February 17, 1970 (the expiration of the Rhine patent) are subject to this accounting. As set forth in the court's finding 6 herein, the parties have stipulated that Ford used 9,098,945 F-T pumps during the period as contended for by plaintiff. Plaintiff contends that the "reasonable royalty" it calculates, with apportionment, to determine the "Option" pump revenue results in the amount of reasonable royalty to be awarded Ellipse for Ford's infringement during the period August, 1964, through February 17, 1970, in an amount of $5.79 per "Option" pump, or a total of $52,682,891 on 9,098,945 pump units, but not including rebuilt or remanufactured pumps. Plaintiff also contends that Ford induced others to infringe Patent 2,628,568 by remanufacturing infringing pumps in the quantity of 397,548 units and that Ford itself manufactured 85,000 rebuilt or remanufactured pumps. Ellipse calculates the "reasonable royalty" for Ford's infringement in connection with the remanufactured pumps, during the period August, 1974, through February 17, 1970, at $2,793,952. Ellipse seeks judgment against Ford for "reasonable royalty" in the amount of $55,476,843.

In addition, Ellipse claims it should be awarded interest on the "reasonable royalty" amounts it calculates. In its proposed findings and conclusions, Ellipse computes interest year by year at arbitrary rates and arrives at a total of $41,401,257.90. This amount of interest when added to the $55,476,843 plaintiff seeks as damages for inringement equals a total of $96,878,100.90 that Ellipse seeks from Ford in this case.

Such an award of damages and interest would be a windfall and make multi-millionaires out of the two lawyers and the Moss family for a comparatively small investment. Some estimate of this original investment is shown by the evidence herein. In 1954 Marvin Rhine sold 25 of his shares in Ellipse to H. J. Moss at $40 per share and based on that transaction (as found in finding 21 hereof), Ellipse's issued stock of 300 shares had

a total value of $12,000. As time passed and there was no grant of any licenses, it was reasonable to expect Ellipse's stock would decline in value; and it appears it did, as on January 7, 1966 Mrs. Bess Rhine Conroy (who had remarried) sold her 100 share interest in Ellipse to S. Moss for $3,000 or $30 a share. (DAX-166, 182). Shortly thereafter, on January 28, 1966, an agreement was entered into between Simon H. Moss, Harvey Moss, Norman Lettvin and Maurice Rosenfield (DAX-184). At the time of the agreement S. H. Moss owned 293 shares and Harvey Moss owned 7 shares of Ellipse and they were the sole stockholders. Under the terms of the agreement S. H. Moss agreed to sell 117 common shares of Ellipse to Norman Lettvin for $1,170, and 14 common shares to Maurice Rosenfield for the sum of $140. Under the agreement, Rosenfield subscribed for 169 common shares and agreed to pay therefor the sum of $75,000 in cash within 90 days after the execution of the agreement. This agreement shows that in January of 1966 Ellipse was proposing to sue either or both of Ford and Chrysler Corporation under the Rhine patent and that Lettvin had been retained to handle and supervise the litigation. As set forth in finding 5, *supra,* Messrs. Lettvin and Rosenfield had by April 25, 1966 a controlling 64% interest in Ellipse. This suit against Ford was filed shortly thereafter on August 2, 1966.

Ellipse now proposes the court enter a $55,476,843 judgment against Ford for reasonable royalty under its profit theory plus $41,401,257.90 in interest, or a total just under $97,000,000. This would be a huge windfall on the stockholders' comparatively small investment. It would be grossly unfair under the circumstances of this case to make such an award of damages, plus interest, and grossly unfair to the thousand of stockholders of Ford Motor Company who have invested millions of dollars in the production of automobiles and have contributed to the social and economic development of this nation and the world. Such an award would be inequitable and indefensible both in equity and law under all the circumstances of this case.

In its DAX-157 Ford has shown the effect of patent royalties on the cost of alternative pumps available to Ford in 1963-64. A royalty of $5.57 per pump, as proposed by Ellipse, would have cost Ford almost $6 more than the Saginaw pump which was acceptable to it. TRW quoted Ford a price of $8.39 in 1963-64. Considered as a percentage, a royalty of $5.79 would result in a royalty rate of 69%. Ford paid an average price of $10 for F-T pumps during the period 1965-70. Based on this average price, plaintiff's proposal represents a royalty rate of 57.9%. The pumping element of the F-T pump (the only portion covered by the Rhine patent) represents a cost of approximately $2.50. As a percentage of that cost, $5.79 represents a royalty rate of 232%. Royalties of this magnitude are clearly unreasonable. Ford, as hereinafter in finding 26 set forth, was during the period 1955-70 paying less than 1% for a reasonable royalty on high volume items to be used in its automobiles.

[3] The court has carefully considered plaintiff's profit theory and contentions but finds they are unsupported by either the applicable law or the facts of this case. Ellipse's damages, not Ford's profits, are the proper measure of recovery under 35 U. S. C. § 284. *Zegers* v. *Zegers, Inc.*, 458 F. 2d 726 (7th Cir.), *cert. denied,* 409 U. S. 878, 93 S. Ct. 131, 34 L. Ed. 2d 132 (1972). The evidence in this case is clear that the only damage Ellipse has suffered is the loss of royalties it would have received if Ford's use of the F-T pump had been under an appropriate license agreement. The compensation to which Ellipse, therefore, is entitled under 35 U. S. C. § 284 is a reasonable royalty. The approach to be used in determining a reasonable royalty has been stated in *Horvath* v. *McCord Radiator & Mfg. Co.*, 100 F. 2d 326, 335 (6th Cir. 1938), *cert. denied,* 308 U. S. 581, 60 S. Ct. 171, 84 L. Ed. 529 (1939) in the following terms:

> In fixing damages on a royalty basis against an infringer, the sum allowed should be reasonable and that which would be accepted by a prudent licensee who wished to obtain a license but was not so compelled and a prudent patentee, who wished to grant a license but was not so compelled.

[4] In substance, application of that rule, often referred to as the "willing buyer-willing seller" rule, involves a determination of the reasonable market value of a license under the Rhine patent. Among the questions to be resolved in determining the market value are (1) what would Ford, as a prospective willing buyer, have been willing to pay for a license, and (2) what would Ellipse, as a prospective willing seller of a license, have been willing to accept. (Tr. 16948-57; 16987-17001; 17257-59).

[5] Those questions, as well as the ultimate question of "reasonable royalty" must be resolved in light of the facts and circumstances known to the parties at the time they, hypothetically, would have negotiated a license had it been known that Ford's use of the F-T pump would infringe the Rhine patent.

None of plaintiff's proposals is based on this appproach. It has entirely ignored the particular facts and circumstances of Ford and Ellipse. It has offered little evidence that is pertinent to such issues as the reasonable market value of a license under the Rhine patent in light of other pumps then available in the market place. The profits it computes for the F-T pump are not, in fact, profits but an arbitrary allocation or apportionment of profits on the basis of a cost ratio.

[6] Based on the evidence in this case, the court is satisfied that neither a willing buyer nor a willing seller would make a decision as to a royalty on the basis of such an arbitrary allocation of profit.[3] (Tr. 17025-71), (17088-113). Nor is there any

3. Even if a cost ratio apportionment was relevant, the approach plaintiff has used is unsatisfactory. For example, plaintiff's cost ratio omits a number of elements of cost that are incurred by Ford before an automobile equipped with a power steering pump leaves the factory. Having erroneously omitted these costs, the resulting "profit"

(Footnote continued on next page.)

evidence that "profits," whether allocated or otherwise, would have any relevance, under the circumstances present in this case, to what either Ford as a willing buyer would be willing to pay or Ellipse as a willing seller would be willing to accept as a reasonable royalty. For these and other reasons that appear hereafter, plaintiff's proposals for a reasonable royalty cannot be accepted.

The Time of the Hypothetical Negotiation

8. While the evidence does not precisely pinpoint when Ford's infringement commenced, Ford first received four prototypes of the F-T pump from TRW sometime after March 7, 1963. T&C engineers installed some of those pumps in a car but they failed almost immediately (Tr. 12197-99). T&C worked with TRW to resolve the problems encountered with the pump in 1963 and early 1964. (Tr. 12201). Ford's negotiations with TRW for the F-T pump were concluded on August 8, 1963 when an agreement between the two companies was executed (DAX-60) and a purchase order was released. (DAX-132). By April or May, 1964, manufacture of the F-T pump by T&C was in progress (Tr. 12207-09; DAX-127).

The hypothetical negotiations are, therefore, time placed in the period of mid-1963 to early 1964 (hereinafter "1963-64"), when Ford began to manufacture and to use the F-T pump.

(Footnote continued from preceding page.)
computation is erroneous as well (Tr. 14717-20, 14675-76). Plaintiff also separates the pump and the power steering system from the car in which they are sold, in effect treating Ford as a marketer of pumps. Since the car is a necessary part of any sale of a power steering system, any apportionment of profit must include the vehicle in which the pump is installed and sold. Defendant has demonstrated that, had plaintiff included the vehicle in its cost ratio methodology, there would be no "excess" profit. (DAX-155D, 162, 163).

THE CIRCUMSTANCES OF FORD IN 1963-64

Power Steering In the Automobile Industry

9. A power steering system provides a hydraulic assist that takes over most of the effort of steering the automobile. (Tr. 11261). The power steering system includes a power steering gear (which replaces the manual steering gear), a pump, a power cylinder, brackets, hoses, belts, pulleys and fittings. (Tr. 11259-11272; DAX-107A, B, 108A, B, 113). The only function of the pump is to provide hydraulic fluid under pressure to the system (Tr. 11261, 11264, 11301).

Since the 1950's, each of Ford's competitors has offered power steering options for their cars (DAX-113, 114). The pumps for these power steering systems have been supplied by various companies in a highly competitive market. (Tr. 11811-14, 12846-59, 12875-79; DAX142A-H; 143A). General Motors has, since at least as early as 1953, used a vane type pump manufactured first by Vickers, Inc. and later by GM's Saginaw Steering Gear Division ("Saginaw"). (DAX-113, 114; Tr. 11797-801). Chrysler Corporation has used a non-infringing slipper pump manufactured by TRW (DAX 108, 113, 114) as well as the Saginaw vane type pump (DAX-114; Tr. 11804-07). American Motors has used a non-infringing slipper pump manufactured by TRW, a non-infringing roller pump manufactured by Eaton Corporation ("Eaton") and the Saginaw vane type pump. (DAX-114; Tr. 11804-08, 12853). In the early 1960's, Ford's power-steering system used a roller pump manufactured by Eaton. (DAX-114).

10. In early 1963, T&C investigated the possibility of manufacturing a portion of Ford's requirements for power steering pumps commencing with Job No. 1, 1965[4]. Several design alternatives were investigated to determine the most desirable

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4. Job No. 1 refers to the start of a new model year. The model year 1965 started at approximately August 1, 1964.

pump from a product and manufacturing feasibility standpoint. (DAX-150G). The designs considered were:

Current Eaton design,
Proposed Eaton design,
Saginaw (Vickers Vane) design,
Thompson (slipper) design.

The Eaton Design

11. At the time of T&C's investigation, Ford was purchasing all of its power steering pumps from Eaton, including both a crankshaft mounted roller pump for the Lincoln and a belt driven roller pump for the other Ford car lines. (Tr. 11266-68; PAX-82; DAX-150G). T&C was primarily interested in manufacturing pumps for the car lines that used the belt driven pump. Eaton was willing to permit T&C to do so under a "make-buy" arrangement whereby T&C would be permitted to manufacture a portion of its power steering pump requirements using Eaton's design and technology, provided Ford purchased the remainder of its pump requirements from Eaton. (Tr. 12843-47).

Both the then current Eaton design and the modified design were unbalanced roller pumps. (DAX-142B; Tr. 12830-31). The modified design had a wrap-around reservoir similar to the arrangement of the Saginaw and F-T designs (Tr. 11666-67, 12829-31; DAX-142B). Eaton had been selling the current design at an average price of approximately $9.39 but proposed to supply the modified design in model year 1965 at a reduced price of $7.80 with a tooling cost of $325,000. (DAX-142B, -142C). Both the current and modified Eaton designs would have been available to Ford for Job No. 1, 1965. (Tr. 12860, 12870).

The Saginaw Design

12. The Saginaw pump was a balanced vane type pump designed by Vickers, Inc. (Tr. 11797, 11811). Its construction is similar to the F-T pump except it uses flat vanes instead of slippers (PAX 137, p. 58). Saginaw manufactures products for

other divisions of General Motors, and actively seeks to sell those products to outside customers as well. (Tr. 11727-28). Saginaw had previously sold products to Ford, including steering gears, under a "make-buy" arrangement. (Tr. 11730-31).

Saginaw offered to supply its vane-type pump to T&C on a "make-buy" arrangement whereby Ford would be permitted to manufacture a portion of its power steering pump requirements, using Saginaw's design and technology, provided Ford purchased the remainder of its requirements from Saginaw. (PAX-137, p. 58, Tr. 11728-32). The Saginaw pump would have been available for Job No. 1, 1965 (DAX-119A), and Saginaw would have supplied the pump to Ford at the same price it supplied the pump to divisions of General Motors. (Tr. 11728). Saginaw submitted to Ford a quote of $8.48 per pump with a tooling charge of $50,000. (DAX-119A, Tr. 11734-40).

The TRW Design

13. The F-T pump design is similar to the Saginaw pump except it uses slippers instead of flat vanes (PAX-137, p. 58). It is also similar to the slipper pumps Ford had used in its two speed automatic transmissions, except that it is a balanced pump. Ford had obtained the transmission slipper pump from Federal Industries, a predecessor of TRW, on a "make-buy" arrangement. T&C had manufactured a portion of Ford's requirements for the transmission pump so it was generally familiar with slipper pumps when the investigation was conducted in 1963. (PAX-137, pp. 45-46, 59-60, 61, 74, 266).

TRW first quoted a price of $8.69 per pump and tooling costs of $361,000 for a portion of Ford's requirements (DAX-131). Subsequently, TRW reduced the price by 25¢ to $8.44 (DAX-150L), and later to $8.39 with tooling costs of $133,000 (DAX-150F).

T&C's Evaluation of the Alternative Designs

14. On March 7, 1963, the Product Engineering Office for T&C presented an internal report to Ford management en-

titled, "Power Steering Pump Analysis" (PAX-82; Tr. 11686-87). The report recommended the adoption and use in Ford automobiles of the F-T pump for eight specified reasons, none of which is in any way related to the "mismatching area contact" found by the Court of Appeals to be the patentable distinction of Claim 3 over the prior art:

(a) *A Diametrically Pressure Balanced Pump*

The T&C engineers were interested in a pressure balanced pump, whether it used rollers, vanes or slippers (Tr. 12673-74).[5] Rhine was not the inventor of pressure balanced pumps. Vickers patent No. 1,989,900 (DAX-44) discloses a pressure balanced pump and the Saginaw pump, based on the Vickers design, was pressure balanced. Also, the Eaton crankshaft mounted roller pump was a pressure balanced pump. (Tr. 11682, PAX-82).

(b) *An Axially Pressure Loaded Pump*

This concerns the use of fluid pressure to apply pressure against the end plates of the pump. (Tr. 11683). This feature is not related to Rhine's contribution of mismatching area contact; end plates are not part of the combination claimed in Claim 3. The Saginaw pump also had pressure loaded end plates (PAX-82; Tr. 11684); the Eaton pump did not.

5. Eaton's belt driven pump was pressure unbalanced and this was the major reason it was rejected by T&C. (Tr. 12299-303; 12690-91). In 1962 Ford had encountered problems with that pump and the T&C engineers believed that the root of the problem resided in its unbalanced design. While Eaton assured Ford that the problem was only one of quality control and that the problem had been corrected, T&C engineers were skeptical. It was not until mid-1963 that it became apparent that Eaton was correct. By that time the T&C engineers had recommended that the F-T pump be adopted (Tr. 12212-13, 12256-61). Ford did continue to purchase the crankshaft mounted roller pump from Eaton throughout the period 1963-70 (Tr. 12143) and, in fact, purchased and used the unbalanced Eaton belt driven pumps in model years 1964 and 1965 without any problems. (Tr. 11612, 12207, 12871).

(c) *Cartridge Type Pumping Element*

The F-T pumping element was of a so-called cartridge construction that permitted removal and replacement of the pumping element as a unit. (PAX-82; Tr. 11684). This has nothing to do with Rhine's contribution of mismatching area contact. The Saginaw pumping element was also of a cartridge construction (PAX 82; Tr. 11684); the Eaton pumping element was not.

(d) *Cartridge Type Flow Control Valve*

Each of the pumps available to Ford had a flow control valve. The Rhine patent does not disclose a flow control valve of any kind (Tr. 12161). The F-T pump had a cartridge type flow control valve which, like the pumping element, could be replaced as a separate unit. The cartridge type flow control valve used in the F-T pump is disclosed in TRW patents Nos. 3,200,752 (DAX-126A) and 3,314,495 (DAX-126B). (Tr. 12157-60).

(e) *Greater Manufacturing Feasibility*

The F-T pumping element had fewer critical manufacturing operations as compared to the other pumps evaluated. (PAX 82, Tr. 11690). This was due to the slipper construction which did not require finishing operations either on the slippers or on the slots or pockets in which they were received. (Tr. 11690-95). This is an advantage inherent in all slipper pumps and was expressly recognized as such in the prior art Livermore patent No. 2,278,131 (DAX-117; Tr. 11703-06). The non-infringing slipper pumps Ford used in its automatic transmissions had this same advantage. (PAX-137, pp. 37, 40; DAX-58, p. 14).

(f) *Slippers are Postively Loaded*

This refers to the presence of springs that serve to bias the slippers out against the stator wall. (PAX-82; Tr. 12160). Neither Saginaw nor Eaton had such springs. Nor does the

Rhine patent disclose the use of springs. (Tr. 12161). The positive loading of the slippers by using springs is expressly disclosed in the prior art Livermore patent No. 2,278,131 (DAX-117; Tr. 12160-61).

(g) *Competitive Weight*

At the time the report, PAX-82, was prepared, T&C estimated that the weight of the F-T pump would be slightly less than that of the Sagniaw pump. However, by the time the F-T pump was in production, it actually weighed more than both the Saginaw and Eaton pumps. (Tr. 11714-17, 12145-46; PAX-84; DAX-118).

(h) *Comparable Volumetric Efficiency*

T&C's analysis in 1963 indicated that the Saginaw pump and the F-T pump would have comparable volumetric efficiencies, with Eaton somewhat lower. (PAX-82; Tr. 11718).

Ford Selected the F-T Pump Because, Among Other Things, of Its Manufacturing Feasibility and Potential For Future Design Savings

15. The evidence is that Ford selected the F-T pump because it was believed, in 1963-64, to be more desirable. (Finding 47G). Among other advantages of the F-T pump was its manufacturing feasibility and potential for future design savings. (DAX 150G).

There is no evidence that Ford expected to realize a competitive advantage in the marketing of its automobiles by using the F-T pump. The undisputed fact is that customers do not purchase Ford automobiles because of the particular power steering pump used in the power steering system. (Tr. 9127-28; 9164-69).

Contemporaneous documents in the period 1963-64 show that Ford selected the F-T pump over the Saginaw pump because, among other reasons, T&C proposed to manafacture a portion of Ford's pump requirements and it was the opinion of Ford's

engineers that the F-T pumping element, due to fewer critical tolerances, would be easier for T&C to manufacture than the Saginaw vane type pumping element:

(a) The study by the T&C engineers, as reported in PAX-82, rated the pumping element of the Thompson pump superior to the pumping element of the Sagninaw pump only in terms of manufacturing feasibility.

(b) In a report dated March 22, 1963 (DAX-150G) the Transmission and Chassis Division stated that, "after evaluating the design alternatives available, product engineering indicated that Saginaw and Thompson designs were superior in basic design and serviceability." The report further stated:

> "While the Saginaw and Thompson pumps were relatively equal from a product standpoint, it has been determined that the Thompson design is a more easily manufactured unit and yields the most potential for future design savings. We are, therefore, recommending that we integrate the Thompson design pump, Job No. 1, 1965."[6]

(c) In a meeting held on April 4, 1963, representatives of Ford's engineering, finance and purchasing staffs considered T&C's proposal to manufacture some of Ford's power steering pumps. The only advantage attributed to the Thompson pump in that meeting was its manufacturing feasibility as compared to the Eaton and Saginaw designs (DAX-150A).

(d) In a report issued on February 6, 1964, T&C rated the F-T pump equivalent to the Saginaw pump in all areas except that the "F-T pump is superior to competition for critical manufacturing tolerances in the pumping elements" (DAX-125, pages 19-22).

T&C's opinion that the F-T pumping element had greater manufacturing feasibility than either Eaton or Saginaw was based on a judgmental study in 1963 of the various components

6. "Design savings" refers to savings achieved through a change in design. (Tr. 14432) In the case of the F-T pump, the changes in design ultimately required to make it acceptable *increased* the cost of the pump very substantially. See, Findings 25(a), *infra.*

of each of the available pumps. It was concluded that the F-T pumping element would be a "few pennies" less expensive to manufacture than the Eaton and Saginaw pumping elements. (Tr. 12676-78).

Ford's Agreement with TRW

16. By May 17, 1963, the proposal to use the F-T pump designed by TRW had been approved, in principle, subject to a satisfactory piece price, manufacturing rights agreement and warranty agreement (DAX-150E). TRW held exclusive rights under a number of Livermore patents, some of which covered the F-T pump offered to Ford (DAX-150C). In addition, TRW intended to file patent applications of its own on other features of that pump (DAX-150H). Accordingly, Ford undertook negotiations with TRW, concluding, on August 8, 1963, with an agreement (DAX-60, 132) the terms of which included the following:

(a) Ford received a royalty-free, non-exclusive license under the patents TRW owned or controlled to make, use and sell the F-T pump, provided Ford purchased at least 35% of its requirements of F-T pumps from TRW. (DAX-60)

(b) TRW agreed to supply its 35% of Ford's requirement for the F-T pump at a unit price of $8.39, subject to adjustment.[7] (DAX-132).

(c) TRW had quoted a lump sum price of $133,000 for tooling (DAX-150F); the parties agreed to a tooling charge at a per unit price of 18¢ spread over a three year period (DAX-132). Ford, at that time, was projecting planning volumes at a level of 670,000 pumps per year. (DAX-150L, 150M).

7. The price of $8.74 in DAX-132 included tooling amortization at 18¢ per unit and a warranty charge of 17¢ per unit, with the base pump price set at $8.39.

Ford Had Acceptable Non-Infringing Alternative Pumps Available to it throughout 1964-70.

17. Throughout the period of 1964-70, Ford's ability to offer power steering options for its automobiles was not dependent on its use of the F-T pump. While, in 1963, Ford did believe the F-T pump was the more desirable, any one of the pumps offered to Ford at that time would have satisfactorily met Ford's power steering requirements. (DAX-128; Tr. 11300, 11612-13, 12191-97, 12882, 12690-91). Two pumps, the F-T and Saginaw, were competitive in performance, availability and price. The Eaton pump was highly competitive in price and the competitive equal of the others in terms of availability, but less competitive from a performance standpoint.

The ability of the Eaton roller pump to meet Ford's needs is apparent from Ford's use of the pump in model year 1964. In fact, when Ford required additional pumps for model year 1965, it purchased those same roller pumps from Eaton (Tr. 12871) and used them, together with the F-T pump, in its various car lines. (Tr. 11612). Eaton containued to sell the same roller pumps to American Motors up to 1970. (Tr. 12853).

That the Saginaw vane type pump would have satisfactorily met Ford's power steering requirements throughout the period 1964-70 is beyond question. The Saginaw pump offered to Ford has been in production by Saginaw and used by General Motors in all of its car lines since the 1950's; it has also been used in the automobiles of Chrysler and American Motors. (DAX-114). Millions of those pumps have been employed in power steering systems.[8] (Tr. 11801). The cost of "packaging", i.e., the pulleys, brackets and hoses, the F-T and Saginaw pumps for installation in Ford cars would have been approximately the same. (Tr. 12262-64, 12269). The cost of tooling and facilities for T&C

8. In fact, Ford commenced purchasing vane type pumps from Saginaw in 1971; those pumps were basically the same pumps offered by Saginaw in 1963. (Tr. 12689-90). By 1977, Ford was using the Saginaw pump on 6 car models. (Tr. 11612, 12681)

to manufacture the Saginaw pump would have been approximately the same as for the F-T pump. (Tr. 13240).

That Ford would have entered negotiations with Ellipse in 1963-64 with the Saginaw and Eaton pumps as acceptable alternatives to the F-T pump is confirmed by a document dated April 22, 1963 (DAX-150C). In that document, those pumps were expressly recognized as alternatives that Ford could use should the then upcoming negotiations with TRW not prove to be successful.

THE CIRCUMSTANCES OF ELLIPSE IN 1963-64

18. In 1963-64, Ellipse had no manufacturing facilities. (Tr. 10635). It had no engineers, and it had no full-time employees. (Tr. 10632-35). It had but one asset, the Rhine patent (App. pp. 1389-90). Although Ellipse was willing to grant licenses under the Rhine patent to any pump manufacturer or any automobile company interested in manufacturing pumps (Tr. 10646-47), no person, firm or concern has ever requested a license (Tr. 13533) and Ellipse has been unsuccessful in interesting anyone in taking such a license (Tr. 10656). Counsel for Ellipse has stipulated that Ellipse had absolutely no bargaining power in 1963-64 (Tr. 10639).

The Hypothetical Negotiations and Determination of a Reasonable Royalty

[7, 8] 19. In entering negotiations, a willing buyer for a patent license must make a decision as to the maximum he can pay as a royalty for the patented item and still be better off than choosing an available alternative. Similarly, the willing seller must make a decision as to the minimum royalty he can accept from the prospective buyer and still be better off than choosing an alternative course of action. Among other things, to arrive at those decisions, the normally prudent businessman will determine, in light of his particular circumstances at the time, the differences in cost (in the case of the buyer) or revenue

(in the case of the seller) between the alternatives available to him and then select the more favorable course of action. (Tr. 16985-17065, 17257-302). As plaintiff's expert Mr. Weinstein, testified:

> Mr. Cooper:
>
> "Q. As I understood your definition of a willing-buyer and willing-seller, as you understand it, it is the result of an arm's-length transaction between two parties, a buyer and a seller, neither of which is under compulsion to buy or sell. Am I generally correct, sir?
>
> Mr. Weinstein:
>
> A. Yes, that is the accounting concept.
>
> Q. You have two parties to the transaction, don't you?
>
> A. Right.
>
> Q. A buyer and a seller?
>
> A. Right.
>
> Q. So when we decide what would be the outcome of that arm's-length transaction, we have to take into account the buyer and the seller; isn't that correct, sir?
>
> A. Absolutely.
>
> Q. If you have a buyer, a prospective buyer who is not under compulsion to buy, isn't it correct, sir, that the buyer in that circumstance would have to evaluate the alternatives available to him before he would determine what he would be willing to pay?
>
> A. Yes.
>
> Q. Isn't it also correct that a seller would have to evaluate the alternatives available to him before he would determine what price he would be willing to accept?
>
> A. Yes." (Tr. 18981-82).

20. The revenue Ford receives by selling a car equipped with power steering would not vary with the pump used in the system, (DAX-105; Tr. 10824-31). From Ford's standpoint as a willing buyer, it, as a prudent businessman, would select the pump with the least cost, provided the pump was satisfactory from a performance standpoint. It had, in 1963-64, two pumps, the F-T and the Saginaw, that were equally satisfactory from a

performance standpoint (PAX-82, DAX/150G). In negotiations with Ellipse, Ford, as a normally prudent businessman, would have been primarily concerned with the effect of any royalty Ellipse might demand on the cost of the F-T pump as compared to the cost of the Saginaw pump.[9] (Tr. 13681-93). Mr. Weinstein admitted Ford would not be expected to agree to pay a royalty that would increase the cost of the F-T pump above the cost of an equally acceptable alternative pump such as Saginaw. (Tr. 19065-69).[10] Ford has contended that to determine the *maximum* it could pay to Ellipse, Ford, as a prudent businessman, would analyze the differences in cost between the F-T and Saginaw pumps. (Tr. 19176).

In 1963-64 Ford was projecting volumes of 670,000 pumps per year (DAX-150L, 150M). At those volumes, had Ford taken a license from Ellipse commencing with its model year 1965 vehicles, it could foresee using approximately 3,685,000 pumps during the five and one-half years (August 1964 to February 1970) then remaining on the life of the Rhine patent. Based on that total number of pumps and the differences in cost between the F-T pump and Saginaw pumps as Ford would have seen them in 1963-64, the evidence establishes that Ford could have reasonably expected to save a total of $478,887.50 by using the F-T pump instead of the Saginaw pump during the 5½ year period (DAX-180). (In computing that amount the

9. Plaintiff's profit theory on which it has based its entire case ignores this fundamental point. All of the witnesses to have addressed the point are unanimous in their testimony that when revenue will not vary among several alternatives, the prudent businessman looks to the relative *costs* of the alternatives, not to profit. (See the testimony of Mr. Soper, Tr. 14767-72; Mr. Harris, Tr. 15222-26; Mr. Cameron, Tr. 14459, 14601-0.; Dr. Weil, Tr. 16985-17065, 17066-71; Mr. Weinstein, Tr. 18986-88; 19065-69). There is no evidence that Ford, as a prospective licensee, would have considered "profits" in negotiations for a license. In fact, since the F-T pump is but a part of a larger entity, there is no identifiable "profit" on the pump.

10. Plaintiff's proposed royalty would have converted the F-T pump from one highly competitive in cost to one that was almost $6 more expensive than the equally acceptable Saginaw pump. (DAX-157).

court has taken into consideration all of the differences in cost between the F-T and Saginaw pumps, assuming 35% of the pumps were to be purchased and 65% to be manufactured by T&C.) Ford contends the $478,887.50 saving by using the F-T pump instead of the Saginaw pump represents the *maximum* Ford could have paid as a royalty for a non-exclusive license from Ellipse without increasing the cost of the F-T pump above the cost of the Saginaw pump (DAX-180; Tr. 17257-17301);[11] and that if Ford had to pay any amount larger than that Ford would be better off with the Saginaw pump (Tr. 17277-302).

However, it is clear from the hearings before the Special Master and this court that Ford did consider the F-T pump more desirable in many respects. In addition, Ford, as a prudent businessman, probably would have paid a premium in order to have a license to produce the F-T pump which it could control rather than the Saginaw pump which was controlled by General Motors, its largest and strongest competitor.

21. From Ellipse's standpoint as a willing seller, it was confronted with a highly competitive market. Being incapable of competing in that market, the alternatives available to Ellipse in 1963-64 were limited. Ellipse could either non-exclusively license the patent to companies such as Ford and TRW, or it could dispose of the patent, either by sale or exclusive license.

11. In *Union Carbide Corp.* v. *Graver Tank & Mfg. Co.*, 345 F. 2d 409 (7th Cir. 1965), the court held, at 411, n. 2:

> . . . in calculating damages, the patent owner may recover only for the difference between the patented product and such other as the infringer could have used had he known he infringed.

Mr. Weinstein agreed that DAX-180 assesses the difference between the F-T and Saginaw pumps. (Tr. 19006-9). Mr. Weinstein was unable to identify any relevant item of cost overlooked in DAX-180 (Tr. 19065). Nor was he able to identify any specific costs, known to the parties in 1963-64, that should have been used in place of those used in DAX-180 (Tr. 19063-65; 19010-27). Plaintiff's proposed royalty computations wholly ignore the differences between the alternatives available to Ford and the effect of such alternatives on negotiations for a royalty. *See, e.g., Hughes Tool Co.* v. *G. W. Murphy Industries, Inc.*, 491 F. 2d 923, 930-31 (5th Cir. 1973).

As Mr. Moss, Ellipse's president, testified, since the Rhine patent was Ellipse's sole asset, either selling the patent or exclusively licensing it would be the same as selling the corporation. (Tr. 18812-13). Thus, in arriving at the *minimum* it could accept, Ellipse would be largely influenced by the amount its stockholders would receive should they pursue such alternatives as selling the company, and with it the Rhine patent. (Tr. 17264-68, 17327-43, 17371-79).

There is evidence in the record that provides some guidance as to the amount Ellipse's stockholders could realize from the sale of the company, and with it the Rhine patent (DAX-182-188). For example, in 1954, the inventor, Marvin Rhine, sold 25 of his shares in Ellipse at a price of $40 per share (DAX-182). Based on that transaction, Ellipse's issued stock (300 shares) had a total value of $12,000. Since the Rhine patent had a finite life of 17 years, it is reasonable to expect that the value of the Ellipse stock would decrease, not increase, as time passes without the grant of any licenses and Ellipse's sole asset approaches expiration. (Tr. 17328-39). A liberal estimate of the reasonable market value of Ellipse stock in 1963-64 would, therefore, be $12,000. This is confirmed by the amount Mrs. Rhine received for her interest in Ellipse. Based on her sale of 100 shares to S. Moss for $3,000 (DAX-166), the total value of Ellipse stock in 1966 had declined to $9,000. Other transfers of stock in 1966 were at $10 per share, although the corporation issued a block of 169 shares for $75,000 (DAX-182, 184). As a normally prudent businessman, it is unlikely that Ellipse in negotiations with Ford would have been willing to accept a royalty less than $12,000 its stockholders would realize by selling the company and, thereby, ownership of the Rhine patent. (DAX-181; Tr. 17263-65, 17322-43, 17371-381).

22. The foregoing establishes one bargaining range—$478,-887 being the maximum Ford contends it could have agreed to pay and $12,000 being the minimum Ellipse would have demanded. Ford contended it is reasonable to expect that rational,

prudent businessmen, had they negotiated, would reach an agreement somewhere in that bargaining range.

23. Ford contended several factors in this case indicate Ford would have agreed on an amount substantially below the maximum Ford could have paid. These include:

(a) Ellipse was offering only a bare, non-exclusive license. It did not have a commercially proven product; nor did it have any manufacturing experience or other technical assistance to offer to Ford.

(b) The Rhine patent pertains only to a portion of the F-T pumps—the pumping element. In terms of cost, the pumping element was only one-fourth of the total cost of the pump. (PAX-17, DAX-190, p. 128). Other features of the pump such as pressure loaded end plates and the cartridge type flow control valve were significant factors in the selection of the F-T pump. (PAX-82).

(c) Ford contends that Rhine's contribution of the "mismatching area contact" did not figure in Ford's decision to adopt the F-T pump, and that the key factor in Ford's decision, manufacturing feasibility, had nothing to do with Rhine.

(d) Ford had to put up the capital ($350,000) to engineer the pump to a commercial level (Tr. 12203); it had to put up the capital (over $2 million) for tooling and facilities (DAX-150G); and it had to assume all the business risks associated with manufacturing both the pump and the vehicles in which the pump would be installed and sold.

Ford contends that, in light of considerations such as these, a reasonable and just outcome of the negotiations would have been an agreement that Ford would pay, as reasonable royalty for a non-exclusive license, a lump sum of $150,000. There appears to be no testimony as to that specific amount and the figure first appears in Defendant's Post Trial Brief and again in its proposed findings of fact. Ford's counsel, in his final argument before the court, suggested that based on an average royalty

of 2¢ per pump multiplied by six million pumps the figure might have been "around" $131,000 and then concluded the negotiations would have resulted in Ford paying the lump sum of $150,000. (Tr. 19936-37). During the accounting proceedings, Mr. Harris, Ford's patent counsel, had testified that an appropriate royalty rate payable to Ellipse would have been 2¢ or 3¢ per pump based on various assumptions. (Tr. 15429-44).

24. Based on the testimony and exhibits in the original liability trial and in this accounting, the court finds there was still another bargaining range for the market value of a license under the patent. Ford has relied principally upon its alternatives and costs in its contentions as to a reasonable royalty. Despite Ford's contentions, the evidence indicates Ford would have paid more than the $150,000 it suggests as the outcome of the negotiations and even more than the $478,887 saving by using the F-T pump.

The court found upon the liability trial that Ford selected the F-T pump because it was more desirable; and the evidence adduced upon the taking of this accounting has further substantiated that finding. Ford did have alternatives available in 1963-64 that would have met Ford's power steering pump requirements and after evaluating them it found the Saginaw and F-T pumps technically superior. Ford did select the F-T pump because it believed at the time it would be easier and less costly to manufacture and had the most potential for design savings. However, the evidence here indicates the choice of the F-T pump over alternatives was not based solely on manufacturing feasibility and costs. In late 1962 and early 1963 Ford had decided it would be a good idea if it began to make power steering pumps; and it was interested in the possibility of manufacturing internally a portion of its requirements for such pumps. There were other advantages Ford saw in the F-T pump that would have been considered by Ford as a willing buyer in the hypothetical negotiations.

The Saginaw pump was controlled by General Motors, Ford's largest and strongest competitor. General Motors set the stand-

ards for the pump. It was manufactured in General Motors' environment, not in Ford's. As Fred M. Ison, General Sales Manager of Saginaw Steering Gear Division of General Motors, testified, there are good business reasons why a company wants to make its own product, including control of quality, better availability, better supply, serviceability, and compatibility of the pump with its own gear. He also admitted that in going into an agreement a company wants to control the manufacture and research so as to introduce the best improvements on a product it can. (Tr. 11818-21, 11833).

Plaintiff has contended that Ford made a decision to ignore Saginaw's design as a matter of policy. Ocie Walthall, Manager of Ford's Steering Gear Department in August, 1961, to July, 1965, admitted upon a deposition in connection with the liability trial that it would be better for Ford to have its own product rather than to buy a General Motors design. He also testified that Ford's policy is not to buy outside purchase parts from General Motors if Ford can get them at the same price from someone else. Mr. Walthall also admitted Ford was also considering whether with its own pump it might have a product on which it could pick up added sales. (PAX-137A, Item "R" at pp. 7, 8; Walthall Dep. pp. 220-227). The benefit of having its own product and its own design rather than a General Motors design is an advantage that would have entered into the negotiations for a reasonable royalty.

Plaintiff has also contended that there is no equivalent of the infringing balanced F-T pump and that there is no equivalence, of substantially the same structure operating in substantially the same way, between the F-T pump and either the Eaton or Saginaw pump. As this court found upon the liability trial (Finding 56), Ford believed the balanced slipper pump it proposed to make and sell was superior to existing pumps and that it included what it proclaimed to be new and useful concepts. (PAX-135, p. 1628). TRW subsequently patented devices that embodied Rhine's development of a balanced slipper

pump and Ford sought out and obtained rights under such subsequent patents by becoming licensed thereunder. (Finding 50; PAX-135, p. 1625).

Despite Ford's contention that Rhine's contribution did not figure in Ford's decision to adopt the F-T pump, the Rhine contribution was embodied in the pump Ford considered more desirable; and rather than to have infringed, Ford would have negotiated for a license from Ellipse. Although a willing seller. Ellipse was not unaware of the interest of the automotive industry in balanced power steering slipper pumps. Ellipse has remained persistent in its efforts to interest others in taking a license under the Rhine patent. Simon Moss, Ellipse's president, did not believe that if hypothetical negotiations had not gone forward with Ford in 1963-64 that those negotiations would have represented to Ellipse the last chance to realize any return on the Rhine patent. (Tr. 10656). Although Ellipse lacked bargaining power (finding 21, *supra*), it is likely it would have, under the circumstances, bargained for considerably more than $12,000.

Although the evidence does not disclose what, if any, communications Ford might have had with TRW about the Rhine patent in the 1963-64 period of hypothetical negotiations, TRW manufactured and sold to Ford approximately 35% of the power steering pumps held to infringe Claim 3 of the Rhine patent. The pumps were sold pursuant to an August 8, 1963 agreement in which TRW agreed to indemnify Ford for the costs of defending any accounting proceeding and for any judgment based on patent infringement by the pumps purchased from TRW (DAX-60). On August 30, 1972, TRW filed a civil action (case No. 72 C 2167) against Ellipse and Ford, as defendants, seeking a declaratory judgment to establish Claim 3 of Patent 2,628,568 was invalid and void and seeking a stay of the accounting proceedings in this case. The court dismissed the action and the Court of Appeals affirmed. *TRW, Inc.* v. *Ellipse Corporation,* 495 F. 2d 314 (7th Cir. 1974).

Rhine did not grant any licenses and there is no established royalty rate for the Rhine patent. Ellipse had not marketed a product. Therefore, the court must determine, retroactively, the question of what the market value of a license was under the Rhine patent and this market value will become the reasonable royalty to which Ellipse is entitled. The court, *supra,* has treated Ford's alternatives and costs in detail. Plaintiff's expert, Mr. Weinstein, admitted that based on an assumption of equal performance of the Saginaw and F-T pumps, Ford would not be willing to pay anything more than 9¢ per pump as a royalty, that being the difference between the quotation of Saginaw of $8.48 per pump and the quotation of $8.39 for the F-T pump. (Tr. 19068). Mr. Harris, Ford's patent counsel, testified that based on certain assumptions and under the circumstances in the 1963-64 period, an appropriate royalty rate payable to Ellipse would have been 2¢ or 3¢ per pump. (Tr. 15429, 15434, 15444). He justified the payment of a higher royalty rate to Vickers Corporation, for example, on, among other things, Vickers being a knowledgeable manufacturer, being able to offer services and having a proven product. However, the assumptions made in the questions upon which these answers were based did not include an assumption of the value to Ford of having a product not controlled by General Motors, Ford's largest and strongest competitor. T&C would have been permitted on a make part—buy part basis to manufacture a portion of Ford's steering part requirements using Saginaw's design and technology, provided Ford purchased the remainder of its requirements from Saginaw. Ford would have been subject to such limitations as General Motors might choose to make in connection with the Saginaw pump. Ford would have been concerned with the effect of the cost of a royalty to Ellipse on the F-T pump, but as prudent businessmen Ford's management would have recognized the advantage of having the F-T pump rather than one controlled by General Motors.

The foregoing advantages should be taken into consideration together with alternatives and costs in determining reasonable royalty. The court reaches a conclusion as to the reasonable and just outcome of the hypothetical negotiations in its Conclusion, *infra*. In reaching the conclusion, the court has taken into consideration the following additional factors, including an assessment of the impact of the facts and events transpiring subsequent to 1963-64, other patent licenses granted to Ford and Ford's negotiations for other power steering pump licensees.

Facts and Events Transpiring Subsequent to 1963-64

25. (a) Due to the changes required to make the F-T pump commercially acceptable (Tr. 12197-12203; DAX-133-135), the price actually paid by Ford for the F-T pump turned out to be in excess of the price at which Ford could have purchased the Saginaw pump throughout the infringing period. (Saginaw's prices are found in DAX-119C-L)[12]

(b) To the extent Ford experienced an increase in installation rate of power steering options in Ford automobiles, that increase merely paralleled that of the auto industry as a whole.[13] This was the case both during 1960-1964 when the Eaton pump was used and during 1965-1970 with the F-T pump (DAX-122M). Since Ford cars are not purchased because of

12. For example, due to the numerous engineering changes required in the F-T pump, TRW's original price had, by Job No. 1, 1965, risen by 84¢ (DAX-133-135). As a result, the average price of an F-T pump in 1965 was $9.84; Saginaw's price was $8.57. (DAX-119H). Adjusting the F-T price to eliminate 35¢ for tooling amortization and warranty (items not included in the Saginaw unit price) and the cost of painting and identification tags (11¢) (DAX-133-135) which would have been applicable to all pumps, Saginaw's pumps were still less expensive than the F-T pump. However, by the time that became apparent, Ford had invested over $2 million at T&C in tooling and facilities (DAX-150G) and $350,000 in engineering costs (Tr. 12203) to make the F-T pump.

13. The popularity of power steering on an industry wide basis is reflected in the installation rate of power steering systems in automobiles which rose from 4.6% in 1952 to approximately 50% in 1963-64 and continued to increase until by 1970 the rate had reached 85%. (DAX 122L, M).

the particular pump in it, the fact that Ford sold more cars equipped with power steering pumps than was anticipated in 1963-64 cannot be attributed to Rhine.

(c) Ford expected the F-T pump, because of the cartridge construction of the pumping element and flow control valve, to be more serviceable. In fact, the dealers encountered extreme difficulty in servicing the pump. (DAX-83).

(d) Ford purchased F-T pumps from TRW at the following average prices: $9.84 (1965), $10.30 (1966), $10.39 (1967), $10.34 (1968), $10.48 (1969), $10.37 (1970).[14] T&C, which operates as a separate profit center in the Ford organization, "sold" the F-T pumps, it manufactured to the Ford Division at a transfer price governed by TRW's prices. During the period 1964 to February, 1970, T&C lost an average of 28¢ per pump (DAX-158, 159; Tr. 14812-24). TRW had a similar experience during the same period, sustaining a loss of 2.3% on its sales of the F-T pump to Ford. (DAX-136; Tr. 12619-34)

Examples of Patent Licenses Granted to Ford

26. DAX-160 summarizes all of the patent licenses taken by Ford on high volume items to be used in automobiles during 1955-70. That exhibit, and the testimony of Robert Harris, Ford's patent counsel for 35 years, establishes that a reasonable royalty on such high volume items is less than 1%, usually 0.1% to 0.5%, of the price the automotive company pays for the item. In the automotive field, the royalty is usually expressed in the license agreement either as a lump sum or as a fixed amount per unit[15] with a specified paid-up maximum royalty

14. Ellipse erroneously contends these prices represent Ford's costs for the F-T's pump and has used those amounts in its cost ratio to apportion a profit to the pump for each of the model years. There are many other elements of cost, such as transportation, labor and overhead, associated with the pump and incurred by Ford before an automobile equipped with a power steering pump leaves the factory. (Tr. 14717-20)

15. Ellipse's patent expert, Mr. Snyder, testified that a fixed per unit royalty is frequently used for devices that may be incorporated in a larger unit and it is difficult to assess what the value of the de-

(Footnote continued on next page.)

or "cap" (Tr. 15215-31; DAX-160). The following are examples from that exhibit:

(a) In 1956, Ford negotiated a non-exclusive license on a group of patents for automatic transmissions. The unit royalty was 50¢-60¢ on transmissions costing approximately $150. Ford sold millions of the transmissions covered by these patents. (Tr. 15265). Expressed as a percentage, the royalty ($0.60 ÷ $150) is 0.4% (DAX-160, License G-57; Tr. 15259-66).

(b) In 1953, Ford negotiated, and in 1963, renegotiated, a non-exclusive license on automatic transmissions. The royalty varied by car line, ranging from 5¢ to 15¢ per car with a paid-up cap of $200,000. Millions of transmissions were sold by Ford. Expressed as a percentage, the maximum per unit royalty ($0.15 ÷ $150) is 0.1%. (DAX-160; License S-73; Tr. 15281-85).

(c) In 1959, Ford negotiated a non-exclusive license on an anti-dive suspension system that was used on a number of Ford's car lines. The royalty was 5¢ per vehicle. (DAX-160, License T-36; Tr. 15275-77).

(d) In 1963, Ford negotiated a non-exclusive license under a patent on synchronizers for manual transmissions. The specified royalty was a lump sum of $200,000. (DAX-160, License P-53; Tr. 15275-77).

(e) In 1965, Ford negotiated a non-exclusive license under a patent for an automatic choke that Ford then used in millions of its carburetors; the carburetors each cost in the range of $10-20. The royalty specified was a flat 5¢ per carburetor. Expressed as a percentage of $10, the royalty is 0.5%. (DAX-160, License G-73; Tr. 15267-70).

(Footnote continued from preceding page.)
vice is to the overall structure. (Tr. 7599). A royalty on a percentage basis is used, according to Mr. Snyder, when the patented item is sold separately (Tr. 7600) and a lump sum royalty is also sometimes used. (Tr. 7602-4).

(f) In 1967, Ford was non-exclusively licensed under a group of patents on storage batteries. Ford paid a lump sum of $225,000 for the license and an additional $225,000 for technical assistance from the licensor. Millions of the batteries were produced at an average cost of $10. Assuming production of five million batteries, the royalty expressed as a percentage $225,000 ÷ $50,000,000 is 0.45%. (DAX-160, License G-78; Tr. 15271-74).

Other evidence on licenses in the accounting record is also pertinent:

(g) Mr. Snyder, one of Ellipse's patent experts, was a former employee of Borg-Warner Corporation. In describing his licensing experience, he identified a license negotiated with Ford under certain Roche patents pertaining to transmissions. (Tr. 7499-501, 7514, 7520). That license (DAX-161) required Ford to pay a flat rate of 18.5¢ per unit on transmissions that cost Ford approximately $150. Expressed as a percentage, the royalty ($0.185 ÷ $150) was 0.12%. (Tr. 15369-80)

(h) As a result of litigation with International Nickel Company, Ford, in 1959, took a non-exclusive license under a patent on nodular iron technology useful in Ford's production of crankshafts. The royalty rate was 1.14 per ton. Ford was producing about 40 crankshafts per ton for an average royalty of 2.8¢ per crankshaft. The price of a crankshaft was about $5.00 so the royalty, expressed as a percentage ($0.028 ÷ $5.00) was 0.5%. (Tr. 16626-42).

Other Power Steering Pump Licenses

27. (a) In 1960, Ford negotiated a non-exclusive license under 14 patents owned by Vickers on its vane type power steering pumps. In addition, Vickers agreed to supply Ford with blueprints and technical assistance in manufacturing the pump. (DAX-151; Tr. 13679-80). The royalty specified was 30¢ per pump with a paid up maximum royalty of $700,000. Allocating

the amount over the total number of F-T pumps used by Ford up to February 17, 1970 represents a unit royalty of 7.7¢ per pump. Vickers was a knowledgeable manufacturer with a demonstrated commercial product.[16] It could provide substantial technical assistance for producing the pump and, because of its demonstrated commercial use, the licensee assumed little risk in producing and using it. Ellipse had no manufacturing knowledge to provide a licensee and the pumps it had made were neither commercially proven nor acceptable. (Tr. 13693-98, 15429-33).

(b) In 1952, Federal Industries (a predecessor of TRW) negotiated an exclusive license from William T. Livermore under a number of Livermore patents on slipper pumps. (DAX-53B). At least one of the licensed patents (No. 2,599,927) also covered the F-T pumps here at issue. (DAX-150C). The license provided for royalties on the following scale:

First	10,000 Licensed Pumps	5% of Net Sales
Next	10,000 Licensed Pumps	4% of Net Sales
Next	10,000 Licensed Pumps	3% of Net Sales
Next	170,000 Licensed Pumps	1⅔% of Net Sales
Next	300,000 Licensed Pumps	1% of Net Sales
Next	1,000,000 Licensed Pumps	⅔% of Net Sales
Next	2,000,000 Licensed Pumps	⅓% of Net Sales
Remainder	Licensed Pumps	¼% of Net Sales

(DAX-53B)

Applying the foregoing scale of royalties to the total number of F-T pumps in this case, the average royalty rate would be 0.846%. (DAX-156A, B; Tr. 14799-14804, 14809-10). At TRW's average sale price of approximately $10 for each F-T pump, the Livermore royalty on a unit basis would have been 8.5¢ per pump. Livermore was a well known inventor in this field (App. II pp. 1528-29, 1549-50), and the license he granted to Federal was exclusive under a number of patents.

16. The Saginaw pump was based on the Vickers design. (Tr. 11797-11811).

Ellipse had no reputation in this field and the license it would grant would be nonexclusive under a single patent.

Conclusion

28. In 1963 the Saginaw pump, which would have served the same purpose as the F-T pump, was offered to Ford at a price of $8.48 per pump (DAX-119A, Tr. 11734-40) at about the same time that the F-T pump was offered to Ford by TRW at a price of $8.39, a price which was 9¢ less per pump. (DAX-132, DAX-150F, Tr. 19065-68).

As Ford considered the F-T pump more desirable and advantageous, it is reasonable to assume that Ford as a prudent buyer would have paid some larger amount than 8.5¢ or 9¢ per pump for the F-T pump but very little more. The court finds that, under all the circumstances and facts as they existed immediately prior to the time Ford began using the F-T pump, Ford would not have paid more than 10¢ per pump as a reasonable royalty to Ellipse. The court finds Ellipse would have accepted 10¢ per pump as a reasonable royalty at the time and that 10¢ per pump would have been agreed upon as a reasonable royalty if Ford had known that Ford's use of the F-T pump would infringe Rhine's patent. Ellipse would have accepted such a royalty as it then had no other market for its patent. By entering into such a royalty agreement Ellipse would have been assured a substantial income from a royalty on millions of pumps using its patent.

[9, 10] Accordingly, the court finds that a reasonable royalty to which Ellipse is entitled is 10¢ per pump upon 6,568,203 pumps used by Ford, or $656,820.30. This amount is Ellipse's damages. The court further finds that Ellipse should be awarded judgment for that amount less certain adjustments as set forth in the following Additional Findings of Fact.

Additional Findings of Fact

29. On September 1, 1978, Special Master David J. Shipman filed herein a Master's Certificate for Compensation in

which he sought to have the amount of his compensation determined and assessed by the court. Counsel for the parties filed responses thereto. Thereafter a signed stipulation, dated October 25, 1978, was presented to the court in which counsel for the parties and the Master stated (1) that in accordance with an earlier joint proposal of the parties on September 25, 1978, the Master had agreed that under all the circumstances a fair and reasonable fee for the Master as his total compensation for this matter would be $150,000; (2) that $110,000 had already been paid to the Master by payments of $80,000 by Ford and $30,000 by Ellipse; and (3) that counsel for the parties and the Master stipulate that an additional sum of $40,000 is due the Master and that this amount may be incorporated in the court's Final Judgment in this case. The court then ordered Ford to advance the $40,000, in accordance with the stipulation, on behalf of itself and Ellipse, and specifically provided that Ford should receive credit for the $40,000 against any judgment entered against it in favor of Ellipse and that said sum of $40,000 should be only an advance by Ford and in no way fixed liability of the parties for any part of the Master's fees. The court agrees that the $150,000 stipulated to by counsel for the parties and the Master is, under all the circumstances, a fair and reasonable fee.

A general standard for setting the Master's compensation is set forth in 5A Moore's Federal Practice, ¶ 53.04[1] at 2926 (1971):

> The court should consider the time necessarily spent by the Master, his ability and distinction, the thoroughness of his services, the amount of money or the impo. tance of the matter involved, and the assistance he has given to a final disposition of the issues that were referred to him.

The court has read the record of the taking of this accounting and at various times has been personally involved in the accounting. It, therefore, is in a good position to consider the factors entering into a determination of reasonable compensation for

the Special Master's services. The Master in his Certificate states that there were approximately 250 trial sessions which produced 231 volumes of transcript totalling over 19,500 pages and that by the end of 1977 he had spent over 4,000 hours in this reference. Counsel for each of the parties in their responses state that counting pretrial conferences, depositions and all days of trial, the Master participated with counsel in proceedings a total of 226 days and both estimate that the Master devoted a total of 636 to 795 hours to actual trial during 1975-77. Counsel for both parties also stated in their responses that they have no way of knowing how much time was spent by the Master, out of the presence of counsel, on this case.

The Master held some 35 pretrial meetings in order to seek agreements and narrow issues of fact and law. He conducted tri-party telephone conversations, and spent 16 days taking depositions in Chicago and Dearborn, Michigan. A variety of motions were made regarding issues which were contested by the parties and the Master spent considerable time studying briefs and preparing his rulings. There was involved an unusual amount of time in correspondence and other informal methods of communications. This accounting was bitterly contested and the record reflects many problems encountered by the Master in dealing with some of the counsel. It is obvious from the record that the Master spent many hours outside the presence of counsel in legal research and in dealing with the complex factual and legal problems involved.

[11] The court finds that the Special Master devoted at least 4,000 hours to this case over approximately a six year period and that the sum of $150,000 is a reasonable amount to be awarded to him as compensation for his services and his contribution to final disposition of the issues referred to him.

Under ordinary circumstances, the whole of the Special Master's compensation for an accounting should be assessed against the infringer but the court has discretion to apportion the Master's fees and costs among the parties. In this case the

court finds that part of such fees and costs should be charged against Ellipse. Ellipse offered extensive testimony and a voluminous number of exhibits in contending for its theory that an award should be based upon Ford's profits rather than Ellipse's damages. Ellipse abandoned some of its charges against Ford on the eve of the liability trial. The Court of Appeals reversed the decree of this court in part. Ellipse offered an excessive amount of irrelevant evidence upon the taking of this accounting. Ellipse has needlessly prolonged this litigation and added to the expense of this accounting. The foregoing are among many factors considered by the court in apportioning the Master's fees and costs.

[12] The court finds it would be inequitable to assess the entire cost of this accounting against Ford. Having reviewed the entire record, it is the court's judgment that each of the parties should bear its own costs and that the parties should share equally both the transcript costs and the Master's fees and costs.

The total amount payable for the Master's fees and costs is $150,000 and a one-half share is $75,000. Ellipse has made advances totalling $30,000 toward payment of the Master's fees and costs, and the amount remaining due from Ellipse under the apportionment is $45,000. Ford has made advances of $55,000 on its own behalf and has made advances totalling $25,000 on behalf of Ellipse, and has further advanced $40,000 on behalf of itself and Ellipse, for a total of $120,000 in payments to the Master. Having already paid $120,000, Ford has an overpayment of $45,000 on its $75,000 share of the Master's fees and costs; and Ford is entitled to a credit therefor against Ellipse's award, thereby reducing Ellipse's award to $611,820.30.

30. Pursuant to the court's orders, Ford has advanced $16,211.13 in payment of Ellipse's share of the court reporter's charges. Ellipse is liable for said sum and Ford should be credited with that amount. The court finds said $16,211.13

should be deducted from Ellipse's award, already reduced to $611,820.30, leaving the sum of $595,609.17.

31. The court has found that each of the parties should bear its own costs in connection with this accounting proceeding. However, there remains outstanding the matter of an award of certain attorney fees to Ford. On appeal, following the liability trial, the United States Court of Appeals in its decision stated:

> We affirm, however, the award of attorney fees to Ford representing the added costs borne by Ford because of the prosecution under the original complaint, until abandoned at the beginning of the trial. Until the abandonment Ford was necessarily put to defending the charge that its transmission pumps infringed the Rhine patent. We think the district court could properly award it attorney fees under Section 285 as a "prevailing party." A proper construction of "prevailing party" applies in the award to Ford under Section 285 because Ford effectually prevailed as to the charge with respect to the transmission pump. Moreover, the award is valid under F. R. C. P. 41(a)(2). 452 F. 2d 163, 172

[13] Having reviewed the record in the liability trial, the court finds that it is familiar with the amount of time Ford's attorneys spent in defending that part of the complaint that was abandoned by Ellipse and with the fair value of attorneys' services therefor, and finds that $5,000 is a reasonable amount to be awarded Ford for attorney fees as provided in the opinion of the Court of Appeals. Said $5,000 should be credited to Ford and deducted from Ellipse's award, thereby reducing Ellipse's award further to $590,609.17.

32. The amount of $590,609.17 is the amount of the judgment that should be entered herein in favor of Ellipse and against Ford.

33. The court finds that a reasonable royalty could not be determined until the conclusion of the accounting proceedings, and that damages accrue, and that interest thereon should run,

only from the date of the court's entry of a judgment establishing the amount of reasonable royalty.

A judgment in this cause is being entered simultaneously with the court's Findings of Fact and Conclusions of Law; and interest on that judgment should be awarded only for the period following entry of the judgment.

This accounting proceeding was needlessly prolonged by Ellipse's persistence in its fallacious theory or profit apportionment. Had this accounting proceeded upon the lawful issue of damages to Ellipse, this court estimates the accounting proceedings could have been concluded within six months instead of six years.

CONCLUSIONS OF LAW

1. Ellipse is entitled to damages adequate to compensate it for defendant's infringement, but in no event less than a reasonable royalty. 35 U. S. C. § 284.

2. Ellipse having failed to mark its own pumps with the number of the Rhine patent and having failed to notify Ford of its infringement, the relevant period of accounting commences on August 2, 1966, the date this action was instituted. 35 U. S. C. § 287. *Dunlap* v. *Schofield*, 152 U. S. 244, 14 S. Ct. 576, 38 L. Ed. 426 (1894); *Union Carbide Corp.* v. *Graver Tank & Mfg. Co.*, 282 F. 2d 653 (7th Cir. 1960), *cert. denied*, 365 U. S. 812, 81 S. Ct. 692, 5 L. Ed. 2d 691 (1961); *Smith* v. *Dental Products Co., Inc.*, 140 F. 2d 140 (7th Cir.), *cert. denied*, 322 U. S. 743, 64 S. Ct. 1146, 88 L. Ed. 1576 (1944).

[14] 3. In patent law terms, what the infringer makes by his infringement are "profits," and what the patent holder loses through the infringement are "damages." *Aro Mfg. Co., Inc.* v. *Convertible Top Replacement Co., Inc.*, 377 U. S. 476, 84 S. Ct. 1526, 12 L. Ed. 2d 457 (1964).

[15] 4. While, prior to 1946, a patent holder whose patent had been infringed was permitted to recover the profits realized by the infringer from his infringement, it is well settled under 35 U. S. C. § 284 that the patent holder's damages, not the infringer's profits, are the sole basis of recovery. *Aro Mfg. Co.* v. *Convertible Top Replacement Co., Inc., supra; Zegers* v. *Zegers, Inc.*, 458 F. 2d 726 (7th Cir.), *cert. denied*, 409 U. S. 878, 93 S. Ct. 131, 34 L. Ed. 2d 132 (1972); *W. L. Gore & Assoc., Inc.* v. *Carlisle Corp.*, 198 U. S. P. Q. 353 (D. Del. 1978), *Georgia-Pacific Corp.* v. *United States Plywood Corp.*, 243 F. Supp. 500 (S. D. N. Y. 1965).

[16] 5. It is the pecuniary loss that the patent holder has suffered from the infringement that is the basis for computing damages under 35 U. S. C. § 284. *Aro, supra*, at 507; *Foster* v. *American Machine and Foundry Co.*, 492 F. 2d 1317 (2nd Cir. 1974), *cert. denied*, 419 U. S. 833, 95 S. Ct. 58, 42 L. Ed. 2d 59 (1974). Where the patent holder has not and cannot itself exploit the patent, the only pecuniary loss suffered is the loss of royalties the patent holder would have, hypothetically, received had the infringing use of the patent been made under an appropriate license agreement. *Trio Process Corp.* v. *L. Goldstein's Sons, Inc.*, 533 F. 2d 126 (3rd Cir. 1976), *Zegers* v. *Zegers, Inc., supra.*

[17, 18] 6. In determining the magnitude of the royalty lost by the patent holder, the court endeavors to determine, retroactively, the reasonable market value of a license under the patent; this market value is what the courts have called a "reasonable royalty". *Egry Register Co.* v. *Standard Register Co.*, 23 F. 2d 438 (6th Cir. 1928). To arrive at market value and, hence, the amount of the reasonable royalty, the court applies the willing buyer—willing seller rule as stated in *Horvath* v. *McCord Radiator & Mfg. Co.*, 100 F. 2d 326, 335 (6th Cir. 1938), *cert. denied*, 308 U. S. 581, 60 S. Ct. 171, 84 L. Ed. 529 (1939):

> In fixing damages on a royalty basis against an infringer, the sum allowed should be reasonable and that which

> would be accepted by a prudent licensee who wished to obtain a license but was not so compelled and a prudent patentee, who wished to grant a license but was not so compelled.

This statement of the rule was approved and applied in this circuit in *Union Carbide Corp.* v. *Graver Tank & Mfg. Co.*, 282 F. 2d 653 (7th Cir. 1960), *cert. denied*, 365 U. S. 812, 81 S. Ct. 692, 5 L. Ed. 2d 691 (1961), and the same rule has been applied in other circuits. *See, e.g., Foster* v. *American Machine & Foundry Co., supra; Georgia-Pacific Corp.* v. *U. S. Plywood-Champion Papers, Inc.*, 446 F. 2d 295 (2d Cir.), *cert. denied*, 404 U. S. 870, 92 S. Ct. 105, 30 L. Ed. 2d 114 (1971); *Egry Register Co.* v. *Standard Register Co., supra; A. Mecky Co.* v. *Garton Toy Co.*, 277 F. 507 (E. D. Wisc. 1921); *Olsson* v. *United States*, 25 F. Supp. 495, 87 Ct. Cl. 642 (1938), *cert. denied*, 307 U. S. 621, 59 S. Ct. 792, 83 L. Ed. 1500 (1939); *W. L. Gore & Assoc., Inc.* v. *Carlisle Corp., supra.*

[19] 7. Determination of a reasonable royalty by application of the willing buyer—willing seller rule assumes a hypothetical negotiation in advance of infringement between the patent owner and the potential infringer, the court viewing the situation from the respective positions of the parties in light of the facts and circumstances as they existed at that time. *Panduit Corp.* v. *Stahlin Brothers Fibre Works, Inc.*, 575 F. 2d 1152 (6th Cir. 1978); *Foster* v. *American Machine & Foundry Co., supra; Tektronix, Inc.* v. *United States*, 552 F. 2d 343, 349 (Ct. Cl. 1977); *Georgia-Pacific Corp.* v. *U. S. Plywood, Inc.*, 446 F. 2d at 296; *Egry Register Co.* v. *Standard Register Co.*, 23 F. 2d at 443; *A. Mecky Co.* v. *Garton Toy Company, supra; Tights, Inc.* v. *Kayser-Roth Corp.*, 442 F. Supp. 159 (M. D. N. C. 1977).

[20, 21] 8. An important factor to be considered in determining a reasonable royalty is the advantage of the patented item over other alternatives available in the market place.

Hughes Tool Co. v. *G. W. Murphy Industries, Inc.*, 491 F. 2d 923 (5th Cir. 1973); *Malleable Iron Range Co.* v. *Lee*, 263 F. 896, 899 (7th Cir.), *cert. denied*, 251 U. S. 562, 40 S. Ct. 342, 64 L. Ed. 415 (1920); *United States Frumentum Co.* v. *Lauhoff*, 216 F. 610, 617 (6th Cir. 1914). The patent owner may recover only for the difference between the patented product and such other products as the infringer could have used had he known he infringed. *Union Carbide Corp.* v. *Graver Tank & Mfg. Co.*, 345 F. 2d 409, 411 n. 2 (7th Cir. 1965); *Union Carbide Corp.* v. *Graver Tank & Mfg. Co.*, 282 F. 2d 653 (7th Cir. 1960), *cert. denied*, 365 U. S. 812, 81 S. Ct. 692, 5 L. Ed. 2d 691 (1961); *Columbia Wire Co.* v. *Kokomo Steel & Wire Co.*, 194 F. 108, 110 (7th Cir. 1911).

[22, 23] 9. Profits have been considered a relevant factor in negotiations between a willing buyer and willing seller only where the patent holder has had an established practice of maintaining the patent monopoly to himself for his own exploitation and profit. *See, e. g., Georgia-Pacific Corp.* v. *U. S. Plywood-Champion Papers, Inc.*, 446 F. 2d 295 (2d Cir.), *cert. denied*, 404 U. S. 870, 92 S. Ct. 105, 30 L. Ed. 2d 114 (1971); *Tektronix, Inc.* v. *United States*, 552 F. 2d 343 (Ct. Cl. 1977). Those facts are not present here. Nor does Ford, as a user of pumps in the power steering systems incorporated in its cars, have a separate "profit" on such pumps. *Cf. Sessions* v. *Romadka*, 145 U. S. 29, 45, 12 S. Ct. 799, 36 L. Ed. 609 (1892). Plaintiff's attempt to apportion a "profit" to the pump has no relevance to the determination of reasonable royalty. Congress amended the patent statute in 1946 to eliminate the recovery of profits precisely because of the impossibility of apportioning profits to a piece or part of a larger entity. *See, Recovery in Patent Infringement Suits: Hearings on H. R. 5231 (5311) Before the House Comm. on Patents*, 79th Cong., 2d Sess. (1946); *Senate Report No. 1503*, U. S. Code Cong. Service, 79th Cong., 2d Sess. p. 1386 (1946).

10. In applying the willing buyer—willing seller rule, the court determines in light of the facts and circumstances at the time of the hypothetical negotiations, the maximum that a willing licensee would have been willing to pay for a license and the minimum that a willing licensor would have accepted. *Georgia-Pacific Corp.* v. *United States Plywood Corp.*, 318 F. Supp. 1116, 1121-22 (S. D. N. Y. 1970), *modified*, 446 F. 2d 295 (2d Cir.), *cert. denied*, 404 U. S. 870, 92 S. Ct. 105, 30 L. Ed. 2d 114 (1971); *W. L. Gore & Assoc., Inc.* v. *Carlisle Corp.*, 198 U. S. P. Q. at 369-70.

11. Considering the amount that Ford, as a prospective willing buyer, would have been willing to pay and the amount that Ellipse, as a prospective willing seller, would have been willing to accept, it is concluded, under the circumstances of this case, that the sum of $656,820.30 is a reasonable royalty and constitutes damages adequate to compensate Ellipse for Ford's infringement. This amount is subject to adjustment, as set forth in findings 29, 30, 31 and 32, *supra*, to an amount of $590,-609.17.

[24-26] 12. It is the rule in this circuit that interest should run from the date damages are liquidated, absent exceptional circumstances. *Wahl* v. *Carrier Manufacturing Co., Inc.*, 511 F. 2d 209, 215 (7th Cir. 1975). Exceptional circumstances require a clear showing of bad faith and fraud which would constitute a gross injustice if not remedied. *Columbia Broadcasting System, Inc.* v. *Zenith Radio Corp.*, 537 F. 2d 896 (7th Cir. 1976). Exceptional circumstances are not present in this case, as the Court of Appeals has so held. *Ellipse Corp.* v. *Ford Motor Co.*, 452 F. 2d 163, 172 (7th Cir. 1971). Ellipse, therefore, is entitled to interest only from the date damages accrue. In the case of a reasonable royalty damages accrue, and interest runs, only from the date of the judgment establishing the amount of the reasonable royalty. *Wahl* v. *Carrier Mfg. Co., Inc., supra.*

13. Rule 53 of the Federal Rules of Civil Procedure vests the court with discretion to apportion the Master's fee among

the parties. *Stromberg Motor Devices Co.* v. *Detroit Trust Co.*, 44 F. 2d 958 (7th Cir. 1930); *Cold Metal Process Co.* v. *Republic Steel Corp.*, 233 F. 2d 828 (6th Cir.), *cert. denied*, 352 U. S. 891, 77 S. Ct. 128, 1 L. Ed. 2d 86 (1956). See generally, Moore's Fed. Prac. ¶ 53.04[1]; *Reid* v. *Silver*, 354 F. 2d 600 (7th Cir. 1965). Similar discretion is granted under Rule 54 with respect to the taxation of costs. *Wahl* v. *Carrier Mfg. Co., Inc., supra; Popeil Bros., Inc.* v. *Schick Electric, Inc.*, 516 F. 2d 772 (7th Cir. 1975); *Jones* v. *Schellenberger*, 225 F. 2d 784 (7th Cir. 1955), *cert. denied*, 350 U. S. 989, 76 S. Ct. 476, 100 L. Ed. 855 (1956). Having reviewed the entire record, it is this court's judgment that each party should bear its own costs and that the parties should share equally both the transcript costs and the Master's fees.

14. The court concludes $5,000 is a reasonable amount to be awarded Ford for certain attorney fees as provided in the opinion of the Court of Appeals in this case. *Ellipse Corp.* v. *Ford Motor Co., supra.*

FINAL JUDGMENT

This cause came on before the court as to the matter of damages to be awarded the plaintiff Ellipse Corporation ("Ellipse") to compensate it for defendant Ford Motor Company's ("Ford") infringement of Claim 3 of the Rhine Patent No. 2,628,568.

The court has considered the testimony and the exhibits presented by the parties in the accounting proceedings before the Special Master and before the court; and the court has also considered the briefs of counsel and has heard oral argument of counsel. The court has further considered the petition of the Special Master for fees and costs; the responses thereto; and the Stipulation regarding the Master's fees filed thereafter by counsel for the parties.

Being fully advised in the premises, the court has this day entered simultaneously herewith its Findings of Fact and Conclusions of Law, and in accordance therewith it is ORDERED, ADJUDGED and DECREED as follows:

1. Damages in the total amount of $656,820.30 are awarded Ellipse as full, complete and adequate compensation under 35 U. S. C. § 284 for Ford's infringement less certain credits to Ford as hereinafter set forth.

2. Each of the parties shall bear its own costs of this accounting and the parties shall share equally both the transcript costs and Special Master's fees and costs.

3. The Special Master, David J. Shipman, is allowed the total amount of $150,000 for his fees and costs. In accordance with the court's orders and taking into account the advances heretofore made by the parties to the Special Master, the amount due the Master is apportioned between the parties, as detailed in the court's accounting Finding of Fact 29 and Conclusion of Law 13 and as summarized as follows:

(a) Ellipse's one-half share of the Master's fees and costs is $75,000. Having made advances of $30,000 toward payment of its share, the amount remaining due from Ellipse under the apportionment is $45,000. Ellipse is liable for that amount.

(b) Ford has made advances of $55,000 on its own behalf and $25,000 on behalf of Ellipse; and Ford has further advanced $40,000 on behalf of itself and Ellipse. Having already paid $120,000, Ford has an overpayment of $45,000 on its $75,000 share of the Master's fees and costs.

(c) Ford is entitled to, and shall have, a credit for its $45,000 overpayment against Ellipse's award, thereby reducing Ellipse's award to $611,820.30, and thereby eliminating Ellipse's obligation to the Master for the remaining $45,000 of its share of the Master's fees and costs.

4. Pursuant to the court's order of July 18, 1977 and November 11, 1977, Ford advanced $16,211.13 in payment of

Ellipse's share of the court reporter's charges. Ellipse is liable for said amount and Ford shall be credited with that amount against Ellipse's award. Ellipse's award, already reduced to $611,820.30, shall be further reduced by said $16,211.13, leaving a total of $595,609.17.

5. In accordance with the court's Finding of Fact 31 in this accounting proceedings, Ellipse shall pay to Ford the sum of $5,000 as reasonable attorney fees for time spent in defending that part of the complaint abandoned by Ellipse in connection with the liability trial. Said $5,000 shall be credited to Ford and against Ellipse's award, thereby reducing Ellipse's award further to $590,609.17.

6. Ellipse shall recover from Ford the total sum of $590,609.17, together with simple interest at lawful rate from the date of this Judgment.

7. Upon payment by Ford to Ellipse of said $590,609.17, Ellipse shall execute and deliver to Ford a written release of all claims arising under U. S. C., Titles 28 and 35, based on the manufacture, use or sale of any and all of the infringing devices included in this action.

Ellipse Corporation, Plaintiff,

v.

Ford Motor Company, Defendant,

No. 66 C 1421.

United States District Court,
N. D. Illinois, E. D.

Dec. 22, 1969.

JUDGMENT

PERRY, *District Judge.*

This matter came on before the court on the pleadings, including the Complaint and Amended Complaint of plaintiff Ellipse Corporation and the Answer thereto of defendant Ford Motor Company. The issues of validity and infringement of United States Letters Patent No. 2,628,568 have been duly tried before the court without a jury, the issue of damages having been separated from the issue of liability under Civil Rule 21 of this Court.

The court has heard argument of counsel, considered the testimony adduced, examined the exhibits and considered the briefs of counsel for the parties. Being fully advised in the premises, the court has this day entered simultaneously herewith its Findings of Fact and Conclusions of Law and in accordance therewith enters judgment herein as follows:

1. The portion of the Amended Complaint which avers that plaintiff is owner of U. S. Patent 2,628,568 and is entitled to recover damages for all infringement thereof by defendant's use and sale of certain accused pumps is sustained.

2. Claims 3 and 1 of U. S. Patent 2,628,568 are valid and have been infringed by defendant's manufacture, use and sale of the form of slipper-type pump used and sold by defendant as a power-steering pump.

3. It is, therefore, considered, ordered and adjudged that the plaintiff have judgment against defendant on account of said infringement. Plaintiff is entitled to damages therefor and to an accounting to determine its damage. The court now enters a final judgment herein for and in favor of the plaintiff herein and against defendant herein on the question of liability. The court reserves jurisdiction herein solely for the purpose of ordering an accounting by defendant to plaintiff and, after the taking of said accounting, to enter a money judgment herein for and in favor of the plaintiff and against the defendant in accordance with said accounting.

4. For the purpose of taking such accounting and determining said damages, the court does hereby appoint David J. Shipman as a Special Master in Chancery of this Court to take and hear testimony of the parties and to thereafter make a written report to the court on said accounting and a recommendation as to the final amount of the money judgment to be included in a decree herein. The court does now order that said Special Master in Chancery shall have the power to administer oaths, issue subpoenas duces tecum and shall have the power to order documents produced by either of the parties. The court further orders that said Special Master shall conduct and supervise all discovery proceedings, shall rule upon all motions concerning discovery, and shall order the taking of depositions or quashing of notices and rule on other routine and contested matters concerning discovery. The court does not intend that the Special Master in Chancery shall be consulted on the routine taking of depositions where there is no controversy between the parties. The Special Master shall report progress herein to the court within ninety (90) days after this judgment order becomes final by virtue of no

appeal being taken within the time for appeal or after a mandate of affirmance in the event of appeal.

5. An accounting, to determine the amount of the damages including interest from the dates when the damages accrued, shall proceed to hearing in due course before said Special Master in Chancery after the parties have had an opportunity to complete their discovery of relevant facts. The discovery period is hereby set to close six (6) months after the date of entry of this judgment, or at such other date as is agreed to by the parties with the consent and approval of said Special Master in Chancery.

6. The fees and costs of the Special Master in Chancery shall be fixed by the court and assessed as costs.

7. The court enters no award for attorneys' fees in favor of the plaintiff herein for the reason that the court considers the plaintiff prosecuted the original Complaint against defendant until immediately before trial when plaintiff filed an Amended Complaint omitting certain allegations for which action plaintiff should pay attorneys' fees to the defendant. The court has offset such attorneys' fees against those it would otherwise award to plaintiff herein.

8. Plaintiff is awarded its taxable costs.

FINDINGS OF FACT

The Parties and Jurisdiction

1. Ellipse Corporation (hereinafter Ellipse) is an Illinois Corporation. Ellipse was issued its charter on August 11, 1945. Ellipse owns Patent 2,628,568 issued February 17, 1953.

2. The original Complaint herein was filed August 2, 1966. Ellipse moved under Rule 15 Fed. R. Civ. P. for leave to file an Amended Complaint which, in effect, omits allegations that certain devices, constructed subsequent to issuance of Patent 2,628,568, embodied inventions of said patent. No evidence was

introduced in support of those allegations appearing in the original Complaint and now omitted in the Amended Complaint.

3. Ford Motor Company (hereinafter Ford) is a corporation with a regular and established place of business in the Judicial District in which this suit has been brought. Ford has sold in this District, prior to filing of the original Complaint, power-steering slipper pumps that have been charged, both in the original Complaint and in the Amended Complaint, with infringement of Patent 2,628,568.

Background of the Plaintiff, the Patent, and this Lawsuit

4. Marvin L. Rhine (hereinafter Rhine), the inventor of Patent 2,628,568, was one of the incorporators of Ellipse. Simon H. Moss (hereinafter Moss) met Rhine through a common interest in machinery, Rhine was not educated as an engineer, but was a dreamer (DX 232, p. 18). Moss was sufficiently impressed by Rhine and by Rhine's ideas for a small pump that Ellipse was formed to develop and promote Rhine's pumps (Tr. 49, 53). Moss was one of the incorporators of Ellipse and has served as president of Plaintiff since issuance of the charter.

5. After Ellipse was established as a corporation, Rhine was a salaried employee of the corporation and served as its vice-president. Rhine constructed and tested a balanced slipper pump with an elliptical stator cavity and slippers of the outline shown in Figure 7 of the patent (Tr. 55, 58). This pump, and Rhine's ideas for various slipper shapes to be used in such a balanced slipper pump were used as the basis of an application for patent (Tr. 56). An application for patent, based on Rhine's balanced slipper pump with elliptical stator cavity, was filed on April 26, 1946. This patent application was assigned to Ellipse and it ultimately issued as Patent 2,628,568, the patent in suit.

6. Ellipse's business, of attempting to make and sell slipper pumps of both balanced and un-balanced design, was carried out during 1946-1948. The business did not prosper. Neither Moss

nor Rhine had the education or ability to properly organize and operate a manufacturing facility.

7. Although regular manufacturing operations terminated in 1948, Ellipse, with Moss as its president, persisted after 1948 in prosecution of the patent application on the balanced slipper pump design. Prosecution of said application resulted in issuance of the patent in suit on February 17, 1953.

8. Ellipse with Moss as its president, also persisted after 1948 in seeking to interest other companies to use slipper pumps. Along this line of endeavor, Ellipse established contact with Ford in 1956 (Tr. 71, PX 4-A). As a result of that contact, Ford issued a purchase order to Ellipse on December 3, 1956 for Ellipse to deliver to Ford two experimental slipper pumps at a purchase price of $4000.00 (Tr. 73-74, PX 4-H, 4-I). In 1957, Ellipse delivered two unbalanced slipper pumps to Ford (Tr. 78). The price for the two pumps was amended in 1957 by agreement of Ford to $5,000.00 (Tr. 75, PX 4-N). Under the written terms of the purchase order of December 3, 1956, no license was granted to Ford under patents owned by Ellipse.

9. Ellipse's president, Moss, believing that ideas from Ellipse's slipper pumps had been adopted by Ford, called Ford's attention to patent 2,628,568, by causing a charge of infringement, together with an offer to negotiate a license, to be sent to Ford on December 21, 1962 (Tr. 78, PX 5-A).

10. Ford's attorneys replied on January 18, 1963 denying that there had been an infringement (PX 5-C). Slipper pumps of the type that were commercially made, used or sold by Ford prior to December 21, 1962 are not involved in this lawsuit.

11. In 1964, beginning with its manufacture of 1965 model automobiles, Ford began the manufacture and sale of a new slipper pump to serve as a power-steering pump for all Ford automobiles using power steering, with the exception of the "Lincoln" models. This power-steering slipper pump, which first appeared in 1965 model automobiles, is the accused device of this suit.

12. The accused power-steering slipper pump has an out-of-round stator cavity that provides a balanced slipper pump. Prior to Ford's manufacture and sale of its accused power-steering slipper pump for first use in its 1965 model automobiles, Ford had never commercially made, used or sold a slipper pump having an out-of-round stator cavity that provided balance.

The Rhine Patent, The Inventions and the Claims at Issue Herein

13. The patent in suit (hereinafter the "Rhine patent") consists of two sheets of drawings, and three printed pages of text that include specifications, three claims, and a listing of 27 United States Patents and 2 Foreign Patents as "References Cited". (PX 3).

14. Rhine's application as originally filed included the two sheets of drawings (PX 71, p. 17-18), the specifications (PX 71, p. 1-7) and 20 claims (PX 71 p. 8-14). In the course of prosecution there were a number of editorial amendments of the original specifications and drawings (PX 71, p. 22, 30, 38-40, 65, 69, 72, 74-76), and, in response to a Patent Office requirement, there was added a section entitled "Practical Operation" (PX 71, p. 23-25), which appears in the printed patent at Column 4, lines 13-74.

15. In Office Action, Paper No. 7 (PX 71, p. 41-42), the Patent Office, noting that two separate inventions were disclosed, required division between claims directed to "a series type of pump" (Group I), and Group II claims directed to a pump structure that included a specific rotor and reciprocating blades, and also required clarification of an earlier response to a requirement of election of species within the Group II claims. The file wrapper makes it clear that claims in Group II were elected (PX 71, p. 43) and that Figure 7 was the preferred and elected species (PX 71, p. 35, 44).

16. The Rhine application, as originally filed and particularly the disclosure of the Figue 7 species, involves the nature and

shape of the pump's stator, its rotor, and the blades that are driven along the stator cavity by the rotating rotor.

17. The objects of the Rhine patent (PX 3) which are relevant to the elected species are:

> "One object of the invention is to provide a pump in which a rotor rotates in a stator, the stator cavity being elliptical in shape and the rotor having pockets in which blades reciprocate radially with their outer ends following the wall of the stator cavity. (Col. 1, lines 3-8).
>
> "A further object is to * * * effect intake of fluid at opposite points in the stator and displacement of fluid at intermediate opposite points * * (Col. 1, lines 20-26).
>
> "Still a further object is to provide modified forms of rotor blades * * having certain structural details which increase their efficiency and impove the pumping action." (Col. 1, lines 33-37).

18. The Rhine patent discloses a "balanced slipper pump", as those terms are accepted today by those skilled in the art. The Rhine patent does not use either of the words "balanced" or "slipper".

The File Wrapper reference patents to Vickers (DX 210) and to Kendrick (DX 213) show that those skilled in the art of rotary pumps at the time of filing of the Rhine patent application knew that use of a stator cavity that was elliptical, or out-of-round as an equivalent of elliptical, for "intake of fluid at opposite points in the stator and displacement of fluid at intermediate opposite points" as disclosed in the Rhine patent (PX 3, Col. 1, lines 23-26), would produce a "balanced pump". Ford's engineers later appreciated this fact by using an out-of-round stator cavity to provide for balance in Ford's power-steering slipper pump. (PX 20).

One skilled in the art of rotary pumps at the time of filing of the Rhine patent application would have known that the "blades" of vane-type pumps, as in DX 210 and DX 213, are circumferentially thin and confined to radial movement in elongated slots without additional pumping action being effected by reason of the radial sliding movement of the blades in the confining slots, while "blades" of slipper-type pumps, as in DX 212, are circumferentialy wide and effect displacement-type pumping of liquid from the pockets in the rotors, which action is described in the Rhine patent as "there is a pocket formed ahead of the blade from which fluid is displaced * * *" and "* * * the stator cavity is supplemented by the spaces ahead of the blades in the rotor pockets * * * " (Col. 4, lines 1-9). Ford's engineers later showed their appreciation of these differences between vane-type pumps and slipper pumps, as reported in PX 45 (p. 11) and in PX 20.

The Rhine patent thus discloses a "balanced slipper pump" as those terms are understood by persons skilled in the art.

19. The Rhine patent discloses a balanced slipper pump wherein the outer face of each slipper "mis-matches" slightly with the wall of the stator cavity during all positions of rotation of the rotor, so as to achieve what is characterized today in the art as the "Kingsbury effect" in slipper pumps. The Rhine patent does not use the term "mismatch" or "Kingsbury effect".

One having knowledge of fundamental principles of geometry would know that, given an elliptical stator cavity as required by the Rhine patent (PX 3: Col. 1, line 5; Col. 2, line 37; Col. 3, line 34; Col. 4, line 4), and the requirement of the slippers that "their outer ends fit tightly against the inner face of the elliptical stator cavity" (PX 3: Col. 3, lines 32-34; Col. 1, lines 7-8), the relationship must always result in a "mismatch" between the outer face of the slipper and the wall of the stator cavity during all positions of rotation of the rotor. (Tr. 1226; 332, 338).

The Rhine patent thus discloses structure that can only produce a mis-match between the outer surface of the slipper and the wall of the stator cavity during all positions of the rotor. (Tr. 2284).

20. In the elected species of Fig. 7 of the Rhine patent, the slippers are provided with an inner periphery of substantially a half-circle in cross-sectional shape. Other shapes for the inner periphery of slippers are shown in Figs. 2, 6 and 11 of the Rhine patent.

In the Fig. 7 species, and also in the other species of slippers disclosed in the Rhine patent, the circumferential and radial size dimensions of the slipper are substantially the same as the size dimensions of the rotor pocket into which the slipper fits. Rhine's specification brings out this feature by describing the "blade" as "of substantially a complementary shape with respect to pocket" (PX 3, Col. 3, lines 25-27). Rhine's specifications as originally filed do not require the slippers to be precisely "complementary" to their respective pockets, as follows both from the use of "substantially" in the foregoing description, and since Rhine advises that "Upon wear occurring the blades merely assume a new working range farther out in the pockets without substantially changing the relationship of the blades to the pockets" (PX 3, Col. 5, lines 2-5). The purpose of having blades substantially complementary to the pockets is to force as much fluid as possible out of the rotor pockets to achieve" * * * a very efficient pump with considerable capacity in spite of small radial movement of the rotor blades" (PX 3, Col. 4, lines 10-12).

21. Claim 3 of the Rhine patent contains a number of important recitations therein, including the following:

(a) "rotary fluid displacement device",

(b) "an out-of-round stator cavity",

(c) "but permit it (the blade) to rock therein with free movement in relation to said pocket"

(d) "the contact between the outer surface of the blade and the inner surface of the stator is area contact * * * the pivot action tending to keep the outer surface of the blade in said area contact with the stator during all positions of rotation of said rotor".

22. When Claim 3 of the Rhine patent is construed in the light of the specification, and both are read with a view to ascertaining the invention, it is determined that Claim 3 is for a combination of elements and:

(a) that the "free movement" set out in Finding 21 requires the "blades" of Claim 3 to be construed as "slippers";

(b) that the "out-of-round stator cavity" set out in Finding 21 requires the presence of an elliptical (or equivalent) stator cavity whose purpose is to provide for a pair of opposed inlets and outlets to the stator cavity;

(c) that "rotary fluid displacement device" must be construed in view of the foregoing limitations to mean "a rotary balanced slipper pump";

(d) and that the "area contact" between the outer surface of the slipper and the elliptical (or equivalent) stator cavity is a "mis-match" between surfaces that only appears to provide area contact for all positions of rotation of the rotor.

23. Claim 1 of the Rhine patent contains therein important recitations including the following:

(a) "fluid displacement device"

(b) "an out-of-round stator cavity"

(c) "blades received therein (in pockets in the rotor) for free movement relative to the pockets"

(d) "each of the blades being substantially a half-circle in cross-sectional shape"

(e) "each of said pockets having a similar shaped bottom"

(f) "said pockets being of substantially the same size as said blades to effect substantially complete displacement of fluid from said pockets".

24. When Claim 1 of the Rhine patent is construed in the light of the specification, and both are read with a view to ascertaining the invention, it is determined that the claim is for a combination of elements, and:

(a) that the "blades" are slippers;

(b) that "out-of-round" requires an elliptical or equivalent shape whose purpose is to provide opposed inlets and outlets;

(c) that the "fluid displacement device", in view of the said limitations, is a balanced slipper pump;

(d) that the "substantially a half-circle in cross-sectional shape" refers to the radially inner periphery of the slipper;

(e) and that the shape and size of the pockets are related "substantially" to the slippers for the purpose of effecting "substantially complete displacement of fluid from said pockets".

The File Wrapper's Influence on Claim Construction

25. In Finding 18 above, it has been determined that the Rhine patent discloses a "balanced slipper pump". This is the only type of pump disclosed by Rhine.

Ford avers that Claim 3 should properly be interpreted to read on an unbalanced slipper pump. Ford asserts that changing the claim-word "elliptical" to "out-of-round" operated to so broaden the claims as to read on un-balanced slipper pumps. Ellipse asserts that "out-of-round" in Rhine's claims means elliptical, as disclosed in the specification for providing a balanced pump, or the equivalent of elliptical that achieves a balanced pump.

[1] As a matter of law, an application for patent cannot be broadened by amendment so as to embrace an invention not described in the application as filed. The Rhine patent does not describe an un-balanced slipper pump. Claim 3 cannot embrace such a device.

There is nothing in the File Wrapper (PX 71) to establish that "out-of-round" as used in Claims 3 and 1 embraces un-balanced slipper pumps.

The File Wrapper discloses that the word "elliptical" appearing in the claims was "somewhat broadened by stating that it (the stator cavity) is out-of-round" (PX 71, p. 33). The said amendment occurred after the Patent Examininer had drawn

attention (p. 19) to Vickers 1,989,900 (DX 210) and Kendrick 2,387,761 (DX 213). Vickers (DX 210) disclosed an elliptical stator cavity for a balanced vane pump. Kendrick (DX 213) disclosed a stator cavity which was out-of-round but not a true ellipse, but providing for a balanced vane pump. The File Wrapper shows that Rhine disclaimed being inventor of an elliptical stator cavity, so that he was "entitled to claims that are broader in this respect as long as they are limited to other patentable distinctions" (PX 71, p. 33).

26. In Finding 22 above, Rhine's Claim 3 has been construed, and it has been determined that the language therein that refers to "area contact" actually refers to a "mis-match" that only appears to provide area contact between the slipper and the stator cavity.

Ford asserts that the term "area contact" in Claim 3 can have but one meaning, namely to define the type of sliding surface-to-surface contact between a slipper and stator cavity as is found in the Blackmer DC 20 pump and the four Livermore patents cited as prior art. The principles of operation of the Blackmer DC 20 pump are the same as in Livermore 2,333,323 (Tr. 175).

There is conclusive evidence in the Record to establish that there can never be a surface-to-surface contact between a slipper and stator cavity where the stator cavity is elliptical, or equivalently out-of-round (Tr. 339-340, 2029, 2281-2283).

Rhine advised the Patent Office (PX 71, p. 55) that the type of contact existing between the walls of his slipper and stator cavity was different than the "constant contract of a blade surface with the stator surface" as found in Livermore 2,333,323.

When the term "area contact" was introduced (p. 65-66) into application Claim 25 (Claim 3 of the patent), Rhine called attention to the fact that, in effect, a special type of "area contact" was involved, saying (p. 67) "The outer surface of the blade is *approximately* the same shape as the inner surface of the

stator and therefore this area contact is secured * * *." (Emphasis supplied.)

The Patent Office had been alerted earlier to the fact that there was something unusual being claimed as occurring between the outer face of the slipper and the wall of the stator cavity when application Claim 25 as originally presented called for "one point of contact (between) the outer surface of the blade * * * with the inner surface of the stator" (PX 71, p. 48-49), and this was accompanied by an explanation (p. 54) that "one point of contact" produces "less wear and friction", but at the same time provided "a constant contact * * * of the outer surface of the blade with the inner surface of the stator".

There is nothing in the file wrapper to estabilsh that "area contact" as found in Claim 3 means the type of surface-to-surface contact found in Livermore 2,333,323. At the same time, the File Wrapper discloses that what amounts to a special type of "area contact" is involved in Claim 3.

27. In Finding 24 above, Rhine's Claim 1 is construed to be directed to a combination of a balanced slipper pump and slippers therein that have a substantially half-circle, cross-sectional shape to cooperate with pockets of a shape and size related "substantially" to the slippers for the purpose of effecting "substantially complete displacement of fluid from said pockets".

Ford asserts that the langauge of Rhine's Claim 1 is limited by file wrapper estoppel to require a construction which drives "out all fluid from the pocket when the blades are seated at the back of the pocket" (Br. 88).

Rhine's Claim 1 resulted from application Claim 23 that derived from application Claim 14. Claim 14 as originally filed called for the blades and pockets "having a complementary shape" (PX 71, p. 13). The Patent Office did not act on application Claim 14 in its first action (pp. 19-21), but Rhine's attorney broadened the phrase "complementary shape" to "similar shaped bottoms" (PX 71, p. 28), and, noting the presence

of references of Curtis and Stevenson, argued that the important features of amended Claim 14 were "the half-circle shape of blade" (p. 35, par. 1) that "have free radial movement relative to their pockets" (p. 35, par. 2).

Claim 14 was then rejected by the Patent Office "as unpatentable over Klise taken alone or with either one of Stevenson, Curtis or Deming" (p. 45). Rhine responded by rewriting Claim 14 as Claim 23 (p. 47). Comparison of Claims 14 and 23 show that Claim 23 added a recitation defining the radial movement as being "in order to contact the wall thereof (the stator cavity)", and added the closing phrase:

> "said pockets being of substantially the same size as said blades to effect substantially complete displacement of fluid from said pockets in the seated positions of said blades".

In the accompanying argument, Rhine pointed out that Klise showed a roller, and the attorney stated: "The half-circle blade is therefore a distinct advance over Klise when Klise is taken alone" (p. 50). Rhine also argued the importance of the "size" limitation that had been added by amendment, stating (p. 51): "Thus any substitution of Stevenson's or Curtis' blades in Klise would still not anticipate claim 23 specifying as it does the size of the pocket with relation to the size of the blade". Rhine distinguished from the remaining rejection by arguing "Any substitution of Deming's arrangement in Klise * * * would require a sliding vane type of blade in Klise with a rocker packing bar as distinguished from a half-circle blade as called for in Claim 23." (p. 51-52).

Rhine emphasized his reliance upon, and the importance of, the phrases quoted hereinabove by stating "It is urged, therefore, that claim 23 has features in addition to former claim 14 which makes it patentable over the references." (p. 52).

[2] Claim 1 is not limited by file wrapper estoppel to a construction which drives "out all fluid from the pockets when the blades are seated at the back of the pocket" as contended by

Ford, since that is not what the amendment resulting in allowance of the claim says. Claim 1 is limited by file wrapper estoppel so that it cannot be read on a pump that includes a roller such as shown in Klise. Claim 1 is limited by file wrapper estoppel to the "size" comparisons between pockets and blades as appears in the last phrase of Claim 1.

Ford's Accused Power-Steering Pump
And The Issue Of Infringement

28. Ford's accused power-steering pump is the subject of an internal report entitled "Power Steering Pump Analysis", in the Record at PX 20. The report admits and proclaims the fact that the proposed power-steering pump is a balanced slipper pump.

The report compares Ford's proposed balanced slipper pump with an un-balanced slipper pump, with roller pumps, and with an un-balanced slipper pump, with roller pumps, and with a balanced vane-type pump, and concludes that the balanced slipper pump is more desirable than all the other pumps.

The report notes an unusual "surface contact" relationship between the slipper and cam surface (wall of the stator cavity) saying (PX 20, p. 10):

> "The radius of curvature of the slipper in the proposed Thompson pump is five times greater than the current roller curvature used in the roller type pumps. This greater radius provides a surface contact between the cam surface and the slipper in a manner similar to the familiar Kingsbury effect. Increased surface contact reduces the unit presssure and the wear potential of the slipper type pump."

The so-called "Kingsbury effect" noted in the Ford report, PX 20, actually refers to the mis-match between the outer surface of the slipper and the wall of stator cavity. The so-called "Kingsbury effect," or mis-match of slipper and stator cavity surfaces, exists in Ford's accused power-steering pump during all positions of rotation of the pump's rotor.

29. All the features discussed in Findings 21 and 22 hereinabove, as appearing in Rhine's Claim 3, such as the "out-of-round stator cavity" that provides for a balanced slipper pump, and the existence of a mis-match between the surfaces of the slipper and stator cavity, are found in Ford's accused power-steering pump.

30. Ford's expert, Booth, admitted that if "area contact" appearing in Claim 3 refers to a mis-match that provides "apparent area contact" as Ellipse's witness Pigott had testified, then Claim 3 reads on Ford's power-steering slipper pump (Tr. 2201-2206).

31. Claim 3 reads on Ford's accused power-steering slipper pump.

32. Finding 27 above notes the existence of two file wrapper estoppels in Rhine's Claim 1, that limit the Claim from reading on pumps using "roller" elements as in Klise, or on pumps wherein rotor pockets are not "substantially the same size as said blades".

Ford's accused power-steering pump does not use "roller" elements such as shown in Klise. Ford's report, PX 20, specifically notes the difference between Ford's slipper and a "roller" type pump element.

In consideration of "size" comparisons, between slippers and rotor pockets, the art shows that circumferential width and radial depth are involved (Livermore '131 patent, DX 211, Claim 1). As to circumferential width, Ford's witness Chiampa testified that the difference in circumferential width between the slipper and rotor pocket in Ford's accused power-steering pump is smaller than can be illustrated in drawings and is only about the size of a human hair (Tr. 2345). Ford's drawings in the Record herein, such as PX 34 show substantially the same relationship between the radial depth of the slipper and the rotor pocket.

33. Ford's power-steering slipper pumps do not avoid Rhine's Claim 1 on the basis of file wrapper estoppel.

34. Rhine's Claim 1 is directed to a combination that includes an out-of-round stator cavity that provides for a balanced slipper pump, and wherein the slippers are each "substantially a half-circle in cross-sectional shape" and positioned in a pocket with a similar shaped bottom, with the pockets being "substantially the same size as said blades" to effect substantially complete displacement of fluid from the pockets when the slippers are in their innermost position in the pocket.

35. Ford's power-steering slipper pump is balanced and provides the "size" relationship between slipper and rotor pocket as specified in Claim 1.

36. PX 75 shows that the inner periphery of Ford's slipper is substantially a half-circle in cross-sectional shape, as specified by Claim 1.

37. Rhine's Claim 1 does not require complete displacement of fluid from the rotor pocket. In Ford's power-steering slipper pump, the slipper occupies so much of the space in the rotor pocket when at its innermost position in the pocket (PX 34) that there does exist "substantially complete displacement of fluid" as specified by Claim 1. The Court has observed motion pictures (DX 248) showing operation of Ford's accused power-steering pump in slow motion. (Tr. 254-260). The "similar shaped bottom" of the pocket called for in Claim 1 is directed to the same objective as the "size" requirements of Claim 1, so that Ford's power-steering pump responds to this recitation on the basis of mechanical equivalents (Tr. 1347-1350).

38. Ford's power-steering slipper pump infringes Rhine's Claim 1 on the basis of mechanical equivalents, as Ford's pump uses a combination of substantially the same elements operating substantially in the same way to achieve substantially the same results.

[3, 4] 39. Ford asserts that the slipper of its power-steering pump adopted a curved inner periphery for reasons of ease of extrusion, quality control and a better seating for the spring rather than for any reasons disclosed in the Rhine patent. But such facts do not constitute a defense to a charge of patent infringement. The law entitles a patentee to benefits flowing from his invention even though such benefits are not disclosed in the patent application as originally filed.

40. The Rhine patent, as well as the prior art, show that many different shapes of inner periphery of a slipper were available for adoption by Ford without any risk of infringing Rhine's Claim 1. The situation herein is similar to that in Diamond Rubber Co. of New York v. Consolidated Rubber Tire Co., 220 U. S. 428, 441, 31 S. Ct. 444, 450, 55 L. Ed. 527 (1911) wherein the Supreme Court said:

> "The prior art was open to the rubber company. That 'art was crowded,' it says, 'with numerous prototypes and predecessors' of the Grant tire, and they, it is insisted, possessed all of the qualities which the dreams of experts attributed to the Grant tire. And yet the rubber company uses the Grant tire. It gives the tribute of its praise to the prior art; it gives the Grant tire the tribute of its imitation, * * *. And yet the narrowness of the claims seemed to make legal evasion easy. Why, then, was there not evasion by a variation of the details of the patented arrangement? Business interests urged to it as much as to infringement. We can find no answer except that given by the tire company: 'The patented organization must be one that is essential. Its use in the precise form described and shown in the patent must be inevitably necessary.' "

The Prior Art And Ford's Allegations Of Patent Invalidity

41. Ford asserts invalidity of Rhine's Claims in view of prior art under both 35 U. S. C.§ 102 and § 103.

[5] Under Graham v. John Deere Co. of Kansas City, Mo., 383 U. S. 1, 17, 86 S. Ct. 684, 694, 15 L. Ed. 2d 545 (1966), the scope and content of the prior art are to be determined;

differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or nonobviousness of the subject matter is to be determined.

[6] Secondary considerations, tending to show subsequent recognition of the discoveries disclosed in the patent in suit and later attempts to patent improvements on the basic discovery of the patent in suit, are factors bearing on the questions of obviousness, as noted in United States v. Adams, 383 U. S. 39, 52, 86 S. Ct. 708, 715, 15 L. Ed. 2d 572 (1966).

42. There are three features, or differences, that distinguish Claim 3 from the prior art relied upon by Ford. Finding 22 above construes the language of Claim 3 as:

(a) directed to a "slipper" pump as distinguished from a "vane" pump;

(b) calling for a balanced slipper pump by reference to "an out-of-round stator cavity";

(c) requiring a mis-matching type of "area contact" between the outer face of the slipper and the stator cavity wall during all positions of rotation of the pump's rotor.

43. There are three features, or differences, that distinguish Claim 1 from the prior art relied upon by Ford. Finding 24 above construes the language of Claim 1 as:

(a) directed to a "slipper" pump as distinguished from a "vane" pump;

(b) calling for a balanced slipper pump by reference to "an out-of-round stator cavity";

(c) specifying a slipper shape whose radial inner periphery is "substantially a half-circle in cross-sectional shape" and which effects displacement pumping in a rotor pocket of "substantially the same size" as the slipper.

44. The prior art relied upon or discussed in Ford's Brief (p. 53-60) are:

(a) Phillips 1,495,526 (DX 209)
(b) Livermore 2,278,131 (DX 211)

(c) Livermore 2,333,323 (DX 212)
(d) Livermore 2,499,763 (DX 214)
(e) Livermore 2,599,927 (DX 215)
(f) Blackmer DC 20 pump (DX 109-B, 109-C)
(g) Vickers 1,989,900 (DX 210)

During the trial, Ford directed attention to the prior art patent of:

(h) Kendrick 2,387,761 (DX 213)

The prior art references of Phillips (DX 209), '323 Livermore (DX 212), Vickers (DX 210) and Kendrick (DX 213) were file wrapper references cited by the Patent Examiner.

The Blackmer DC 20 pump employs the same principles as are disclosed in '323 Livermore (DX 212) (Tr. 175).

There is nothing in the Trial Record to suggest that any of the three other Livermore patents (DX 211, 214, 215) disclose features more pertinent as prior art than those disclosed in the cited '323 Livermore patent (DX 212).

Ford has not relied upon any reference more pertinent than those cited by the Patent Office during prosecution of the application resulting in the Rhine patent.

45. The relevant scope of the prior art is as follows:

(a) Phillips (DX 209) discloses an unbalanced pump with a circular-walled stator cavity against which the outer circular face of a wide blade makes matching area contact. Phillips does not respond to the characteristic of slipper pumps that require radial stroking, or fluid displacement, by the slippers as part of the pumping action of the pump.

(b) '131 Livermore (DX 211) discloses an un-balanced slipper pump that has a circular-walled stator cavity against which the outer circular face of a wide slipper makes matching area contact. The circumferential size of the wide slipper is substantially narrower than the width of the slipper pocket.

(c) '323 Livermore (DX 212) discloses an un-balanced slipper pump that has a circular-walled stator cavity against which the outer circular face of a wide slipper makes matching area contact. In DX 212, Livermore criticizes the circumferential shifting in DX 211 due to difference in size between slipper and rotor pocket, and seeks to limit such shifting.

(d) '763 Livermore (DX 214) discloses an un-balanced slipper pump that has a circular-walled stator cavity against which the outer circular face of a wide slipper makes matching area contact.

(e) '927 Livermore (DX 215) discloses an un-balanced slipper pump that has a stator cavity wall defined by circular arcs with the curvature of the "working arc" selected so that the outer circular face of a wide slipper makes matching area contact therewith. In DX 215, Livermore reports that best efficiency for a slipper pump is secured if the notches for the slippers are wider than the slipper width.

(f) Blackmer DC 20 pump (DX 109-B, 109-C) discloses an un-balanced slipper pump that has a circular-walled stator cavity against which the outer circular face of a wide slipper makes matching area contact.

(g) Vickers (DX 210) discloses a "Vane Type Pump" in which movement of elongated, thin, vanes is restricted to a generally radial direction by confinement in elongated slots. This "vane" pump is balanced. The wall of the stator cavity is of elliptical shape. The outer edges of the narrow vanes make line contact with the wall of the stator.

(h) Kendrick (DX 213) discloses a "vane" type fluid pressure device in which movement of elongated, thin, vanes is restricted to radial directions by confinement in elongated slots. This "vane" type device is balanced. The wall of the stator cavity has an out-of-round rather than a true elliptical shape against which the outer edges of the thin vanes makes line contact.

46. Neither Claim 3, nor Claim 1, can be read on any prior art reference described in Finding 45. Neither Claim 3, nor Claim 1, is anticipated (i.e., known, used or disclosed by others as delineated in 35 U. S. C. § 102) by any prior art reference.

47. In considering Ford's assertion of invalidity of Claim 3 as being obvious under 35 U. S. C. § 103, additional facts appearing from documents and publications become pertinent.

(A) On February 24, 1955, almost 9 years after Rhine's patent application was filed, Livermore filed application for patent 2,977,888 (PX 51) which discloses desirability of a partial mis-match of slipper and stator cavity surfaces in an un-balanced slipper pump.

(B) On August 3, 1955, one Jay M. Roth of Uhrichville, Ohio, as assignor to Mechanisms Company, filed application for patent 2,856,860 (PX 70) which discloses in Fig. 6 a balanced slipper pump defined by an elliptical stator cavity against which the outer face of a slipper moves to "engage in sliding arcuate contact, i.e., greater than line contact" (Col. 4, lines 27-28).

(C) On July 11, 1957, Livermore, Clark and Drutchas as co-inventors file application for patent 3,009,421 (PX 53), with Clark and Drutchas assigning their interest to Thompson Ramo Wooldridge, Inc. (hereinafter TRW). This patent discloses existence of complete mismatching between the outer surface of the slipper and the wall of the stator cavity of an un-balanced pump at all positions or rotation of the pump's rotor (Col. 3, lines 1-5). This patent also confirms that in each of patents 2,278,131 (DX 211); 2,333,323 (DX 212); 2,499,763 (DX 214); and 2,599,927 (DX 215); the construction was such as to "maintain a surface area contact with the pump bore in which the rotor operates" (Col. 1, lines 13-25).

(D) In April, 1960, Jay M. Roth of Mechanisms Co., Uhrichville, Ohio, published a technical article entitled "The

Kingsbury slipper pump * * * design for higher pressures" in Applied Hydraulic Pneumatics magazine (PX 41, p. 73 et seq.). This article reports discovery that a mis-match between the outer face of a wide slipper and the wall of a stator cavity develops a "Kingsbury type fluid film" between such surfaces so that the outer faces of the slipper "alway make area contact instead of line contact".

This is the earliest-dated document in the Record which uses the term "Kingsbury" in connection with mis-matching surfaces in a slipper pump.

Drutchas recalled seeing the Roth article in the magazine after it was published in April, 1960 (Tr. 1121).

(E) On October 20, 1960, a technical paper entitled "The Slipper Type Pump for Automotive Hydraulics" by H. M. Clark of TRW was presented at the National Conference of Industrial Hydraulics at the Sherman Hotel in Chicago (PX 42). The paper discloses a number of forms of un-balanced slipper pumps. In one form of pump there is a U-shaped slipper whose outer face is described as

> "a unique top contour which promotes the formation of an oil film by wedging oil between the slipper and the bore. This is an adaptation of the classic 'Kingsbury' effect * * *" (PX 42, p. 4).

This technical paper advises of the preexisting problems and the challenges to the ingenuity of engineers. It reports the discovery that "the unique slipper pump principle provides many of the answers to this challenge" and that "the bore and slipper wear stresses are also reduced by this film of oil" (PX 42, p. 3-4).

(F) In January 9, 1961, a technical paper entitled "A New Transmission Slipper-Type Pump" by J. W. Guterman of Ford Motor Co. was presented at a Society of Automotive Engineers' meeting in Detroit (PX 45). The paper describes the un-balanced slipper pump used in Ford's transmission and reports that use of such a transmission slipper pump played "a major part" in

successfully achieving the goal of "reduced design and manufacturing complexity, and improved reliability" in Ford's then-new transmission. The paper reports that the movement of the slipper into the slipper pocket is a pumping action that accounts for "approximately one-third of the total pump output" (PX 45, p. 11). The paper also reports that the relationship between the outer face of the slipper and the wall of the stator bore "promotes the formation of an oil film between the slipper and the bore" and that "The bore and slipper were stresses also are reduced." (PX 45, p. 11-12).

(G) On March 7, 1963, Ford's Product Engineering Office" presented an internal report to Ford management entitled "Power Steering Pump Analysis" (PX 20). The report recommends adoption and use in Ford's automobiles of a balanced slipper pump for reasons that it is more desirable, when compared with existing vane type pumps, un-balanced slipper pumps and roller pumps (PX 20, 20A).

(H) On May 16, 1963, Hubert M. Clark and Gilbert H. Drutchas of TRW filed an application for patent 3,200,752 assigned to TRW (PX 39). This patent discloses a balanced slipper pump whose appearance (Fig. 4) corresponds substantially identically with the accused Ford power-steering pump as illustrated in the comparison chart of PX 20. The specification asserts an object of "obtaining the classic Kingsbury effect while stabilizing the slipper action through transition areas in a double lobed [balanced] pumping cavity." (PX 39, Col. 1, lines 60-66). The shape of the slipper is said to be "* * * an extrusion which in cross-section is somewhat circular, thereby to provide a curved inner wall 52 * * *" and "* * * the diameter of curvature of the inner wall 53 is substantially equal to the width of a corresponding notch 46" (PX 39, Col. 3, line 66, Col. 4, line 5).

(I) On August 8, 1963, Ford and TRW entered into an agreement respecting "power steering pumps" providing, *inter*

alia, a license to Ford under TRW's patents in exchange for Ford's agreeing to purchase 35% of its requirements from TRW, and with TRW indemnifying Ford against all judgments and expenses resulting from patent infringement (PX 80).

48. With respect to "Kingsbury", whose name has become associated with mis-match between the outer surface of a slipper and the wall of a stator cavity in slipper pump terminology, the Record discloses that what technology regards as the "Kingsbury-Mitchell" principle was used in the design of "Thrust Bearings" (PX 67, 68) developed near the beginning of the twentieth century, and utilizes a plurality of spaced tilting pillow blocks located in a confined space between two smooth plates (PX 69, p. 64).

49. Considering the group of Livermore patents consisting of DX 211, DX 212, DX 214, DX 215, PX 51, PX 53, the pattern that emerges shows that Livermore believed maintenance of surface area contact between the outer slipper face and the pump bore to be essential for operation of a slipper pump. Livermore's belief began as early as November 7, 1938 (filing date of DX 211) and persisted for many years. It is noted as late as July 11, 1957 in the opening paragraph of PX 53.

An essential concommitant of Livermore's belief in surface area contact was use of a circular stator cavity (later a circular working arc) which dictated that the pump always be un-balanced.

Livermore did eventually reach the conclusion that mis-match between the outer slipper face and the pump bore was desirable and required, but this conclusion was reached only by gradual stages of development (Tr. 1060-1072) when he first used only a partial mismatch in a slipper pump design in 1955 (PX 51), and later when he used a complete mis-match in a slipper pump design in 1957 (PX 53). Livermore's co-worker Drutchas explained that experimental work taught that "when the slipper radius was made the same as the cam (stator cavity) radius" one

obtained area contact which was "not acceptable", but that the Kingsbury effect "is desirable and required" (Tr. 1027-1028).

Even after the desirability of complete mis-match was known in 1957, Livermore, as far as the Record herein is concerned, never suggested design of a balanced slipper pump.

Although Livermore had licensed companies such as Blackmer Pump Co. (PX 9), Borg-Warner (DX 235C) and Federal Industries (DX 235B), the Record fails to show that either he, or his associates Clark and Drutchas of TRW, or any of his licensees, made or suggested making a balanced slipper pump prior to November, 1960 when Ellipse's Moss disclosed the Rhine patent to Drutchas of TRW.

Ford's witness Booth testified that Ford's balanced slipper pump was the brainchild of Clark and Drutchas of TRW (Tr. 1718), but the Record does not disclose the date of conception of such a device at TRW.

50. There is nothing in the Record to explain why Rhine, not educated as an engineer, chose to make and patent a balanced slipper pump whose structure compelled a mis-match between the outer surface of the slipper and the wall of the stator cavity during all positions of rotation of the pump's rotor, or why Rhine preferred a slipper whose inner periphery was substantially a half-circle in cross-sectional shape.

It appears that Rhine proceeded along a path of design which long-accepted and patented design factors militated against. But by so proceeding, Rhine discovered and disclosed to the public a pump structure that constitutes the first balanced slipper pump, and he pioneered the first disclosure of a mis-match between the outer surface of a slipper and the wall of the stator cavity in a slipper pump for all positions of rotation of the rotor.

Although TRW and Ford, as experts in slipper pumps, rejected Ellipse's attempts to license them under the Rhine patent in 1961 and 1962, it is significant that TRW has subsequently recognized the significance of Rhine's invention by patenting

devices that embody Rhine's developments of a balanced slipper pump and mis-matching of the slipper and stator cavity surfaces (PX 39, 40), and Ford has now sought out and obtained rights under such subsequent patents by becoming licensed thereunder (PX 80).

Rhine exercised more than ordinary skill in the art in developing the invention in the patent in suit. His discoveries, although perhaps the result of empirical actions and not based upon use of then-established scientific principles, has nevertheless added a new and valuable disclosure to the world's technical knowledge.

[7] 51. The inventions patented as Claims 3 and 1 of the Rhine patent were not obvious to one having ordinary skill in the art at the time Rhine made his invention.

52. For asserts invalidity of the patent under 35 U. S. C. § 112. There is no evidence in the Record that anyone attempting to construct the patented device failed to do so. The Record actually establishes that Rhine built and tested a balanced pump with an elliptical stator cavity before taking it to the patent attorney for filing a patent application thereon (Tr. 55-56, 58). Claims 3 and 1 meet the requirements of 35 USC § 112, as they particularly point out and distinctly claim the subject matter that was regarded to be the inventions.

[8] While certain terms of the Claims needed to be construed, the patentee was entitled to select his own language as long as his meaning was reasonably plain and specific. Findings 21-24 above establish that Rhine's meaning was plain, specific and distinct as required by § 112.

53. Ford asserts invalidity of Claim 3 on the basis that it is not supported by Fig. 7 of the patent. Ford's witness Booth admitted that the questioned phrase of Claim 3, involving the shifting line of contact between the slipper and the rotor, is common to the patent in suit and the prior art (Tr. 2008, 2014). Booth's direct testimony, which is the sole basis for this averment

of invalidity, was not without conflict as to his qualifications and ability to testify on this issue (compare Tr. 1962-1966 with Tr. 1988, 2001). Ford has not carried its burden of proof of establishing invalidity of Claim 3 as not supported by Fig. 7 of the patent, particularly in view of the statutory presumption of validity and correctness of patent Office determinations.

The Testimony of the Expert Witnesses

54. Ellipse's case was based upon documentary evidence, testimony of adverse witnesses Walthhall and Guterman of Ford, Clark and Drutchas of TRW, Brunson of Blackmer Pump Co., and affirmative witnesses Moss of Ellipse and an expert, Charles Pigott, a patent lawyer practicing in Chicago. Ford had actually called Clark of TRW and Brunson of Blackmer as deposition witnesses on Ford's behalf.

The major witness on Ford's behalf was Booth, previously an employee of TRW, and presented to the Court both as a practical and patent expert.

The principal conflict of testimony was between Ellipse's expert, Pigott, and Ford's expert, Booth. The reason for the conflict of testimony was the premises of their respective testimony. Booth premised his testimony on the assumption that the stator cavity on the Rhine patent is circular and not elliptical as set out in the specifications. When Booth was asked to testify to hypothetical questions that were premised on the fact the Rhine's specification says the stator cavity is elliptical, then Booth's testimony confirmed Pigott's and substantially all conflict between their respective testimony disappeared.

Booth admitted that he agreed with the major points of Pigott's testimony: that it was impossible to match the outer arcuate surface of a slipper with an elliptical bore (Tr. 2281-82); that Rhine's "slipper would not match the bore" (Tr. 2284); and that in Rhine there would be a mismatch for every position (Tr. 2284, 2283).

Booth's direct testimony that is premised upon his belief that Rhine's stator cavity is circular, rather than elliptical as stated in Rhine's specifications, cannot be accepted by the Court.

Booth conceded that his testimony, based on his premise of a circular stator cavity in Rhine, is inconsistent with the language in Claim 3 (Tr. 2300, 2302), but that Pigott's testimony and analysis was consistent with the language in Claim 3 (Tr. 2301).

When Booth testified to hypothetical questions premised upon Rhine's stator cavity being elliptical, which is the fact established by Rhine's specifications, then Booth admitted that Claims 3 and 1 do not read on any prior art patent or device (Tr. 2160, 2134-35, 2138, 2158) and admitted that Claim 3 does read directly on Ford's power-steering pump (Tr. 2201-2207).

Booth also admitted voluntarily that Ford's power-steering pump has "certain features that are claimed in the Rhine claims" which he could not report were to be found in any prior art patents or structures (Tr. 2200-2201).

The Remaining Relief Sought by the Pleadings

55. After Eilipse called the Rhine patent to Ford's attention by a letter dated December 21, 1962, and offered to negotiate a license with Ford on reasonable royalty terms (PX 5A), Ford's counsel, early in 1963, reported a "careful consideration" of the Rhine patent to determine its scope (PX 5B, 5C). Ford made no response to Ellipse's offer to negotiate a license, and responded obliquely to Ellipse's infringement charge by referring only to "pumps currently used in automobile of our manufacture" (PX 5C).

In January, 1963 when Ford carefully reviewed the Ellipse patent, it was true that Ford was then not using balanced power-steering slipper pumps in automobiles of Ford's manufacture, but Ford had knowledge late in 1962 that it planned to make and sell a balanced powersteering slipper pump utilizing a mis-match between the outer surface of the slipper and the wall of the stator cavity (Tr. 385-6, 493-495, DX 116A, B).

56. With full knowledge of the existence and scope of the Rhine patent, Ford deliberately proceeded in 1963 with plans to manufacture and sell a balanced slipper pump that included a mis-match between the outer surface of the slipper and the wall of the stator cavity.

Ford believed that the balanced slipper pump it proposed to make and sell was superior to existing pumps, and included what it proclaimed to be new and useful concepts (PX 20).

57. In 1964, buttressed by an agreement from TRW indemnifying Ford against all judgments and expenses resulting from patent infringement (PX 80), and despite notice, and knowledge of the scope of the Rhine patent that should have alerted any reasonable and prudent businessman to take care not to infringe the patent rights of another, Ford deliberately proceeded to make and sell the accused, balanced, power-steering, slipper pumps without regard to Ellipse's patent rights.

59. Ford called Clark of TRW to testify by deposition on Ford's behalf (Tr. 520). During the deposition, Clark testified about the importance of the "Kingsbury effect", or mis-match between surfaces, that was necessary in order that a slipper pump operate most successfully (Tr. 594-595). Clark also testified that the Blackmer pump did not have the "Kingsbury effect" (Tr. 620-621). Ford's engineer Walthall testified in his deposition that it was impossible to match a slipper surface with an out-of-round stator cavity (Tr. 332, 338). Therefore, Ford knew, or should then have known, that Ellipse's patent provided only a mis-match between the outer surface of the slipper and the wall of the elliptical or out-of-round stator cavity, and that infringement would be deliberate and willful.

60. Ford's expert, Booth, admitted agreeing with Pigott's testimony that the disclosure in Rhine's specifications required obtaining a mis-match between the slipper and the stator cavity for every position (Tr. 2284, 2281-83). Booth also testified that the concept of asserting that Rhine's patent disclosed a circular

bore (DX 243) was his idea reached after listening to testimony in Court (Tr. 2279).

[9] With full knowledge that the Blackmer pump did not include the mismatch necessary to achieve the "Kingsbury effect" that Ford's power-steering slipper pump finds essential, and with Ellipse's charges of patent infringement made only against slipper pumps that included a mis-match necessary to achieve the so-called "Kingsbury effect" (PX 74), the fact that Ford has persisted throughout this trial, and through introduction of Booth's testimony, in attempting to equate the structure disclosed in Rhine, which provides only mis-matching surfaces, with the Blackmer pump which does not have mis-matching surfaces, makes this case an exceptional one as defined by 35 U. S. C. § 285.

CONCLUSIONS OF LAW

1. This court has jurisdiction of the parties and the subject matter of this action.

2. The Rhine patent 2,628,568 issued to the Plaintiff, Ellipse, who owns all rights therein.

3. Claim 3 of the Rhine patent is valid and has been infringed by Defendant Ford's manufacture and/or sale of Ford's balanced, power-steering, slipper pump when sold in automobiles as original equipment or as replacement parts.

4. Claim 1 of the Rhine patent is valid and had been infringed by Defendant Ford's manufacture and/or sale of Ford's balanced, power-steering, slipper pump, when sold in automobiles as original equipment or as replacement parts.

5. Ellipse is entitled to an accounting to determine its damage under 35 U. S. C. § 284, in an amount not less than a reasonable royalty for the use made of the invention by the infringer, together with interest from the dates when damages accrued.

[10] 6. Ellipse is entitled to an award of reasonable attorneys' fees under 35 U. S. C. § 285 but said attorneys' fees are offset against attorneys' fees due to Ford because of the prosecution under the original Complaint until abandoned at the beginning of the trial herein.

7. Ellipse is awarded its taxable costs to be determined by the Clerk of the Court.

Ellipse Corporation,
Plaintiff-Appellee, Cross-Appellant,

vs.

Ford Motor Company,
Defendant-Appellant, Cross-Appellee.

Nos. 18427, 18428.

United States Court of Appeals,
Seventh Circuit.

Sept. 29, 1971.

Rehearing Denied Dec. 13, 1971.

Before HASTINGS, *Senior Circuit Judge,* and KILEY and KERNER, *Circuit Judges.*

KILEY, *Circuit Judge.*

Ford Motor Company (Ford) has appealed from a district court judgment[1] that claims 3 and 1 of Ellipse Corporation's (Ellipse) Rhine patent[2] No. 2,628,568 were valid and had been infringed by Ford's accused power steering pumps. We affirm in part and reverse in part.

Ellipse is an Illinois corporation formed in 1945 to develop and promote the pumps of Marvin Rhine, who subsequently filed application for the patent in suit here. Two years after incorporation Ellipse terminated regular operations. However, it con-

1. 312 F. Supp. 646 (N. D. Ill. 1969).

2. Rhine United States Patent No. 2,628,568, entitled "High Pressure Pump" and issued on February 17, 1953 on an application filed April 26, 1946. The patent was subsequently assigned to Ellipse.

tinued to prosecute the Rhine patent application and to solicit the interest of other companies in its pumps.

The patent application was granted in February, 1953, and in 1956 Ford purchased two pumps from Ellipse. In 1962 Ellipse, in a letter, charged Ford with infringement. Ford declined an offer of license and denied any infringement. The accused devices are the balanced power steering slipper pumps which Ford began using in all of its 1965 automobiles except the Lincoln. On August 2, 1966, Ellipse filed its original complaint charging Ford with infringement of two "forms"[3] of its slipper pumps. Ellipse's subsequent amended complaint charged infringement only against one "form" of pump, the power steering pump. Ford defended on customary grounds of invalidity and non-infringement.

The Rhine patent discloses a rotary pump consisting of a series of stacked circular rotor units driven by a shaft. This assembly is enclosed by a casing referred to as the stator. Each rotor has a series of rounded pockets carved around its periphery. In each pocket is a slipper or blade of similar shape to the pocket. The slipper is permitted to move freely within the pocket. Figure (2) of the patent application shows that the stator departs from the rotor on opposite sides, forming a crescent shaped chamber in each space created. Each chamber has an inlet and an outlet passage through the stator wall, and 90° apart from each other.

As the rotor turns, centrifugal force joins with fluid pressure behind the slippers to push the slippers radially outward against the inner stator wall. When the slippers move through the crescent shaped chambers, they tend to move somewhat in and out of the pockets, since they always remain firmly pressed against

3. Ellipse's original complaint did not specifically charge infringement against both Ford's transmission and power steering pumps. However, by charging infringement against "two forms," the implication was clear that infringement was being charged against both Ford pumps.

the stator wall. This in-and-out movement draws fluid in through the inlet passage and forces it out through the outlet passage of each chamber.

I.

SCOPE OF THE INVENTION

The central issue concerns the meaning and scope of claim 3[4] of the patent which calls for, *inter alia,* A) an "out-of-round stator cavity," and B) "area contact" between the outer surface of the slippers and the inner wall of the stator for all positions of rotation.

Ellipse contends that the language of the patent discloses *only* a "balanced" slipper pump with a "mismatching area contact" between the slippers and the stator. In a "balanced" pump the stator departs from the rotor at opposite ends to provide two diametrically opposed crescent shaped pumping chambers, each with its own inlet and outlet. This is in contrast to an "unbalanced" pump where the stator and the rotor are eccentrically positioned so that there is only one pumping chamber. "Mismatching area contact" between two arcuate surfaces is to be distinguished from and lies somewhere between a line contact—as in a roller pump—and a perfect surface-to-surface contact,

4. Claim 3 of the Rhine patent application reads as follows:
3. A rotary fluid displacement device comprising a stator having an *out-of-round stator cavity,* a rotor located therein, said rotor having blade-receiving pockets, a blade received in each of said pockets, each of said blades having contact at all times during operation with said stator and said rotor, in which the contact between the outer surface of the blade and the inner surface of the stator is *area contact* to prevent complete rotation of the blade in the pocket but permit it to rock therein with free movement in relation to said pocket, and the contact of a side of the blade with the rotor pocket being along a line which varies in position with respect to the blade and the pocket during operation and which acts as a pivot for the blade, the pivot action tending to keep the outer surface of the blade in said *area contact with said stator during all positions of rotation of said rotor.* (Emphasis added.)

where the curvature of the outer surface of the slipper is the same as the curvature of the inner surface of the stator.

This purported "mismatching contact" is the inventive feature of the pump and distinguishes it from the prior art. The mismatching creates a very thin film of oil between the slippers and the stator wall for all positions of rotation; it reduces the friction between the sliding surfaces, adds to the working life of the pump and also increases the pump's efficiency.

Ford asserts error in the district court findings that 1) "area contact" meant "mismatching area contact," and 2) that "out-of-round" was limited to an "elliptical or equivalent" stator cavity. Specifically Ford contends that the language of claim 3 calls for total surface-to-surface contact (*i.e.,* no mismatch) because "area contact" denoted only total surface contact in the prior art. Ford also argues that by amending the claim to call for an "out-of-round" stator cavity, Rhine abandoned his original limitation that the stator cavity be elliptical in shape. Since only an elliptically shaped stator would compel a "mismatching contact" between the slippers and the stator for all positions of rotation, Ford contends that file wrapper estoppel applies and precludes Ellipse from asserting that the patent application disclosed *only* a "mismatching area contact."

[1-3] The general rules for determining the scope and meaning of patent claims are well settled. Claims are to be construed in the light of the specifications and both are to be read with a view to ascertaining the invention. United States v. Adams, 383 U. S. 39, 49, 86 S. Ct. 708, 15 L. Ed. 2d 572 (1965). Proceedings before the Patent Office should be considered in determining the scope of the claims. Graham v. John Deere Co., 383 U. S. 1, 33, 86 S. Ct. 684, 15 L. Ed. 2d 545 (1970). A patentee can choose his own terms and use them as he wishes so long as he remains consistent in their use and makes their meaning reasonably clear. Universal Oil Products Co. v. Globe Oil and Refining Co., 137 F. 2d 3, 6 (7th Cir. 1943), affirmed 322

U. S. 471, 64 S. Ct. 1110, 88 L. Ed. 1399 (1944); Dennis v. Pitner, 106 F. 2d 142, 148 (7th Cir. 1939).

A.

Applying these principles, we agree with Ellipse that there is nothing in the specifications which would indicate that anything but a balanced pump was disclosed. Figure (2) of the specifications clearly shows a balanced pump. The specifications state that one object of the pump is to "effect intake of fluid at opposite points" thus indicating the presence of two opposite pumping chambers which results in a balanced pump.

The term "out-of-round" used to describe the Rhine pump stator wall does not appear in the specifications. "Elliptical" is the only term used there to define the shape of the stator, and it is employed there three times. An examination of the file wrapper shows that all of the original patent claims except original claim 3 used the term "elliptical" to describe the stator. The term "out-of-round" was later substituted for "elliptical" but we do not think—as Ford argues—that the patentee thereby abandoned the limitation of an "elliptical or equivalent" stator cavity.

[4] The doctrine of file wrapper estoppel is that an applicant who acquiesces in rejection of his patent claim and accordingly modifies it to secure its allowance, will not subsequently be allowed to expand (or narrow) his claim by interpretation to include limitations originally given up, or their equivalents. Schriber-Schroth Co. v. Cleveland Trust Co., 311 U. S. 211, 220-221, 312 U. S. 654, 61 S. Ct. 235, 85 L. Ed. 132 (1940); Ekco Products Co. v. Chicago Metallic Manufacturing Co., 347 F. 2d 453, 454-55 (7th Cir. 1965). A necessary condition for the establishment of a file wrapper estoppel is that the patentee must have narrowed (or broadened) his claim in response to an objection by the Patent Office in order to obtain the patent. Bishman Manufacturing Co. v. Stewart-Warner Corp., 380 F. 2d 336, 340 (7th Cir. 1967), cert. denied 389 U. S. 897, 88

S. Ct. 216, 19 L. Ed. 2d 214 (1967). The application of the doctrine is limited to changes made to overcome rejections by the Patent Office because the claim was anticipated by the prior art, Eimco Corp. v. Peterson Filters and Engineering Co., 406 F. 2d 431, 438 (10th Cir. 1968), cert. denied 395 U. S. 963, 89 S. Ct. 2105, 23 L. Ed. 2d 749. It will not apply where changes in the claim are directed to merely overcoming difficulties in particular wording or indefiniteness, Eimco, supra; Sears, Roebuck & Co. v. Jones, 308 F. 2d 705, 708-709 (10th Cir. 1962), cert. denied 371 U. S. 952, 83 S. Ct. 509, 9 L. Ed. 2d 501 (1963), or adhering to the most descriptive recitation of his (patentee's) structure. *Bishman,* 380 F. 2d at 340.

[5] There is nothing in the file wrapper to estop Ellipse from limiting claim 3 to an "elliptical or equivalent" stator cavity. Claim 3 was originally rejected because of the location of the inlet and outlet passages. The Patent Office made no direct reference to the elliptical shape of the stator, and the substitution by Rhine of "out-of-round" for "elliptical" was not directed to overcoming any prior art limitations on the shape of the stator cavity. Rhine's correspondence with the Patent Office shows that the change in the wording of claim 3 was for the purpose of making it clear that he was not purporting to be the inventor of an elliptical stator cavity. There is no file wrapper estoppel where the change in the wording was to clarify that the stator cavity of the Rhine pump could merely be something more than a mathematically perfect ellipse.

In the file wrapper Rhine refers to the limitation in the original claim that the stator be "elliptical," as being only "somewhat broadened" by the added term "out-of-round." That reservation when considered in light of Rhine's apparent purpose in substituting "out-of-round" sufficiently qualifies the scope of other comments in the file wrapper and limits the scope of "out-of-round" to an "elliptical or equivalent" stator cavity, as found by the district court. The failure to strike "elliptical" from the specifications is one more indication that the applicant intended

that term or its equivalent to define the shape of the stator cavity. The district court did not err in construing the scope of the amendment to be an "elliptical or equivalent" stator cavity.

B.

[6] The term "area contact" is not specifically defined in the patent application, nor is it limited to a single meaning in the art. The testimony and documentary evidence show the term was used ambiguously in the prior art to mean surface-to-surface contact and also less than surface-to-surface. However, in proceedings before the Patent Office Rhine describes the outer face of the slipper as *"approximately* the same as inner surface of the stator" (emphasis added), thus indicating a relationship between the two surfaces which is something less than total surface contact at all points. Furthermore, as the district court correctly found, a "mismatching area contact" for all positions of rotation is inherent in the geometric features of the rotor and the stator in the pump. Given an elliptical or equivalent stator cavity with a constantly changing radius of curvature, and a slipper with a constantly unchanging radius of curvature, the resulting contact between the slipper and the stator must be less than perfect and thus "mismatching" for all positions of rotation.

We conclude that the term "area contact" in claim 3 reasonably and plainly called for a "mismatching area contact" for all positions of rotation. The "mismatch" was disclosed in the patentee's use of the term before the Patent Office, and necessarily resulted from the respective geometric shapes of the inner stator wall and outer face of the slippers.

[7] Ford also contends that claim 3 fails to require a "mismatching contact" because of Ellipse's "admissions" with respect to the patent whereby Ellipse purportedly interpreted "out-of-round" as covering circular and non-circular stator cavities. As examples of the "admissions" Ford cites Ellipse's 1962 letter

charging infringement against Ford's unbalanced pumps, and Ellipse's 1966 original complaint charging infringement against Ford's unbalanced transmission pumps. We are not persuaded that any of these or related arguments should change the result we have reached above. *See* W. F. & John Barnes Co. v. International Harvester Co., 51 F. Supp. 254, 262 (N. D. Ill. 1943); McCormick, Handbook of the Law of Evidence, Ch. 27 at 510 (1954).

A patentee's own interpretation under a patent may be some evidence of the scope of a claim, Union Carbide & Carbon Corp. v. Graver, 196 F. 2d 103, 109 (7th Cir. 1952), but the meaning which the inventor gives to his words cannot be made to depend upon subsequent events. It must appear when the application is filed. Universal Oil Products Co. v. Globe Oil & Refining Co., 137 F. 2d 3, 6 (7th Cir. 1943). A patentee's interpretation under a patent may never be used to add to a patent something which was not there at the time of issuance. Ellipse's alleged "admissions" under the patent do not compel a result different from that which we have reached.

II.

VALIDITY

[8] Ford contends that claim 3 of the Rhine patent is invalid by reason of anticipation (35 U. S. C. § 102), obviousness (35 U. S. C. § 103), and indefiniteness (35 U. S. C. § 112). We think the district court did not err by concluding that claim 3 of the patent was valid.

Claim 3 contains several features which distinguish it from the prior art. The claim requires a balanced slipper pump with "mismatching area contact" between the slippers and the stator. In contrast, the Blackmer DC 20 pump discloses an unbalanced slipper pump where there is surface-to-surface contact between the slippers and the circular stator wall. The Livermore '927

pump[5] is also an unbalanced pump with a noncircular stator of various connecting circular arcs and in which the slipper has total surface contraçt with the working arc of the pumping chamber in the stator. Neither of these pumps is "balanced," nor do they provide for "mismatching area contact" between the slippers and the stator for all positions of rotation. There is no anticipation of claim 3 of the Rhine patent.

[9, 10] Nor can we say that the Rhine invention was obvious to one of ordinary skill in the art at the time Rhine disclosed his patent application. Graham v. John Deere Co., 383 U. S. 1, 17, 86 S. Ct. 684, 15 L. Ed. 2d 545 (1965); United States v. Adams, 383 U. S. 39, 86 S. Ct. 708, 15 L. Ed. 2d 572 (1965). There is ample evidence in the record to show the scope and content of the prior art, and the differences between the prior art and the claims at issue. That evidence also shows the existence of factors presenting obstacles to the Rhine discovery. The belief of others experienced in the art, that surface to surface contact was necessary in such pumps, discouraged the used of "elliptical or equivalent" stator cavities in slipper pumps, which in turn dissuaded the discovery of mismatching area contact in such pumps. The failure of other experts working on slipper pumps to make or develop a balanced slipper pump until ten years after the Rhine discovery is further evidence of the non-obviousness of the Rhine disclosure. National Dairy Products Corp. v. Borden Co., 394 F. 2d 887, 890 (7th Cir. 1968), cert. denied 393 U. S. 953, 89 S. Ct. 378, 21 L. Ed. 2d 364 (1968). And the fact that the solution to a problem is simple or appears so when viewed in retrospect does not mean the solution was obvious when it was conceived.

[11] 35 U. S. C. § 112 requires that in order to be valid, patent claims particularly point out and distinctly claim the subject matter which the applicant regards as his invention. Ambiguous, indefinite and vague patent claims are void. The purposes for the precision requirements are to warn others

5. U. S. Patent No. 2,599,927 filed Oct. 6, 1944.

skilled in the art against infringement, and to enable them to benefit from the teachings of the patent. Deep Welding, Inc. v. Sciaky Bros., Inc., 417 F. 2d 1227, 1241 (7th Cir. 1969); Pambello v. Hamilton Cosco, Inc., 377 F. 2d 445, 447 (7th Cir. 1967).

[12] Ford argues that if Rhine claimed as his invention a "balanced," "slipper" pump, with "mismatching contact" between the slipper and the "elliptical or equivalent" stator, then he should have described his invention using those exact terms. However, Section 112 is satisfied where the patentee reasonably discloses the subject matter of the invention in terms which are reasonably clear and consistent. The patentee is his own lexicographer. Universal Oil Products Co. v. Globe Oil and Refining Co., *supra*. Since the terms "area contact" and "out-of-round" stator, when considered in light of the specifications and figures, reasonably disclosed a "mismatching area contact" (*supra* Part I), the requirements of Section 112 were satisfied.

"Slippers," "elliptical shaped stators," "balanced pumps" were all elements known in the prior art. It is not enough for Ford to argue that figure (7) of the patent application does not sufficiently disclose the special nature of the contact between the slippers and the stator. These various components comprising the Rhine pump were known in the prior art, and a person skilled in the art and construing figure (7) in light of the claims and the specifications should have known that the Rhine combination disclosed a "mismatching area contact" since that was the pump's patentable distinction over the prior art. And the specifications state that the "invention consists in the construction, arrangement and combination of the various parts of the pump. * * *" The respective shapes of the contacting surfaces of the stator and the slippers compelled this "mismatching" relationship for all positions of rotation. The special nature of the relationship between the slippers and the stator is further evidenced in claim 3 by the patentee's repetitive emphasis on the "contact" between those two surfaces.

[13] For the reasons stated above, and in view of the presumption of validity that attaches to every issued patent,[6] 35 U. S. C. § 282, Devex Corp. v. General Motors Corp., 321 F. 2d 234, 239 (7th Cir. 1963), cert. denied 375 U. S. 971, 84 S. Ct. 490, 11 L. Ed. 2d 418 (1964); Copease Mfg. Co. v. American Photocopy Equipment Co., 298 F. 2d 772 (7th Cir. 1961), we cannot say that the district court committed error in deciding that claim 3 and figure (7) of the Rhine patent application satisfied the definiteness requirements of Section 112.

III.

INFRINGEMENT

The operation of the Ford power steering pump is similar to that disclosed in the Rhine patent. Both pumps have the basic components in common.

The Ford device is a balanced slipper pump comprising a stator (casting) which encloses a series of circular rotors driven by a shaft. The stator of the Ford pump is neither truly circular nor truly elliptical. It consists of two sets of four connecting circular areas of different radii of curvature. The inner stator wall departs from the rotors on opposite sides to provide two crescent shaped chambers facing each other. Each chamber has an inlet and an outlet passage diametrically opposed to its twin in the other chamber.

It is true that the Ford pockets are rectangular and house freely moving slippers (blades) mounted on a spring which force the slippers radially outward. Also, the outer face of the Ford slipper consists of two lobes of the same radius of curvature but

6. Neither the Livermore '131 and '927 pumps, nor the Blackmer DC 20 pump were cited in the file wrapper. However, the presumption of validity of a patent is strengthened where—as in this case—the prior art relied upon by Ford is the same as or no better than that considered by the Patent Office in issuing the Rhine patent. TSC Industries, Inc. v. International Harvester Co., 406 F. 2d 53, 57 (7th Cir. 1968).

different from those of the four connecting arcs of the stator. However, since the face of each slipper is shaped differently from those of the connecting arcs of the stator, there is always a "mismatch" (less than total surface contact) between the face of the slippers and the inner stator wall during all positions.

[14] We find no error in the district court's finding that the Ford pump encompassed all the features of claim 3, since it is admittedly a balanced pump with mismatching area contact. This is especially true in light of the Ford expert's admission that if "area contact" in the claim referred to a "mismatch," then claim 3 would read on Ford's pump. Infringement exists if the accused device is the structural equivalent of the device described in a patent, and performs substantially the same function, in substantially the same way, to achieve the same results, even though it differs in form or shape. Reese and Reese Products, Inc. v. Elkhart Welding & Boiler Works, Inc., 447 F. 2d 517 (7th Cir. 1971); Union Paper-Bag Mach. Co. v. Murphy, 97 U. S. 120, 125, 24 L. Ed. 935 (1878). We conclude that the district court did not err in determining that Ford's pump infringed claim 3 of the Rhine patent.

However, as to claim 1 we think the district court's determination of infringement was erroneous. Claim 1[7] of the Rhine patent calls for the slippers or blades to be "substantially a half circle" in cross-sectional shape, and the pockets to have a "similar shaped bottom * * being substantially the same size as said blades (slippers) to effect substantially complete displacement of fluid from said pockets."

7. Claim 1 of the Rhine patent reads as follows:

> 1. A fluid displacement device comprising a stator having an out-of-round stator cavity, a rotor rotatable therein, said rotor having blade-receiving pockets, blades received therein for free movement relative to the pockets and radial movement relative to the stator cavity in order to contact the wall thereof, each of said blades being substantially a half-circle in cross-sectional shape, each of said pockets having a similar shaped bottom, said pockets being of substantially the same size as said blades to effect substantially complete displacement of fluid from said pockets in the seated positions of said blades.

[15] The Ford device omits a material element of that claim in that the pockets in the Ford pump are of rectangular shape and house slippers with rounded bottoms. There is thus no "similar shape" between the back of the slippers and the inside of the pockets as called for in claim 1. Moreover, this dissimilarity in shape between the rounded slipper bottoms and the rectangular pockets affects the amount of fluid displaced by the slippers in their most retracted position. Furthermore, the relationship between the slippers and the pockets in the Ford power steering pump so closely adheres to the prior art Blackmer and Curtis pumps that there is no infringement here of the Rhine patent. Where defendant proves "that its devices are built wholly according to the teaching of the prior art and that everything necessary to their conception and construction was taught by such art * * such proof clearly negatives infringement." Casco Products Corp. v. Sinko Tool & Mfg. Co., 116 F. 2d 119, 121 (7th Cir. 1940).

IV.

[16] Finally, Ford appeals the award of attorney fees to Ellipse on the power steering pump issue. An award of reasonable attorney fees to the "prevailing party" in "exceptional cases" is allowed under 35 U. S. C. § 285. We agree with Ford that this is not an "exceptional case" within the meaning of Section 285. The award should not be granted except to prevent gross injustice or fraud, Sanford Research Co. v. Ebernhard Faber, 379 F. 2d 512, 516 (7th Cir. 1967), and we fail to find either present here, where the issues fairly presented have been difficult of solution. The award of attorney fees to Ellipse is manifest error and should be vacated.

[17] We affirm, however, the award of attorney fees to Ford representing the added costs borne by Ford because of the prosecution under the original complaint, until abandoned at the beginning of the trial. Until the abandonment Ford was

necessarily put to defending the charge that its transmission pumps infringed the Rhine patent. We think the district court could properly award it attorney fees under Section 285 as a "prevailing party." A proper construction of "prevailing party" applies in the award to Ford under Section 285 because Ford effectually prevailed as to the charge with respect to the transmission pump. Moreover, the award is valid under F. R. C. P 41(a)(2).

V.

Other incidental issues have been separately presented by both parties in this appeal. After a consideration of them we think that they have been adequately treated in our discussion above, and do not affect the dispositions we have made.

We hold that the court did not err in concluding that claim 3 of the Rhine patent was valid and infringed by the accused device. However, as to claim 1 we reverse the district court determination of infringement.

Affirmed in part, reversed in part.

District Court, N. D. Illinois, E. Div.
TRW Inc. v. Ellipse Corporation et al.

72 C 2167 Decided Mar. 12, 1973

PERRY, *District Judge.*

This cause is before the court on a motion to dismiss the complaint for declaratory judgment filed herein. The court has considered the motion, the pleadings and the briefs of the parties and has heard argument of counsel. The court is fully advised in the premises. A brief review of the history of this litigation in in order.

The defendant, Ellipse Corporation ("Ellipse"), is the owner of Patent 2,628,568 (hereinafter called the "Rhine patent" for its inventor, Marvin I. Rhine, one of the principals of Ellipse). The Rhine patent discloses a "balanced slipper pump", the technical details of which are discussed in the cases immediately hereinafter cited. The Rhine patent has been before this court previously in the case of Ellipse Corporation v. Ford Motor Company, 312 F. Supp. 646, 164 USPQ 161, affirmed in part 452 F. 2d 163, 171 USPQ 513, cert. den. 406 U. S. 948, 173 USPQ 705 (1972). In that case this court held that claims 1 and 3 of the Rhine patent were valid and infringed by Ford Motor Company's ("Ford") accused power steering pumps. The Court of Appeals affirmed this judgment with regard to claim 3 and reversed it with regard to claim 1, holding that claim 1 was not infringed. The mandate of the Court of Appeals was returned to this court on June 5, 1972. The case is now before a Special Master of this court for the purpose of taking an accounting and determining the damages.

TRW Inc. ("TRW"), the plaintiff herein, was the manufacturer of approximately one-third of the power steering pumps

involved in the previous litigation and agreed to indemnify Ford against all judgments resulting from any alleged infringement of any United States patent by the power steering pumps purchased from it. In this action TRW asks that this court declare claim 3 of the Rhine patent to be invalid and that the accounting proceedings in the previous case be stayed pending such determination.

The motion to dismiss raises two issues, specifically: First whether TRW is bound by the decision in Ellipse Corporation v. Ford Motor Company, supra, under doctrine of res judicata; Second whether a controversy sufficient to sustain a complaint for declaratory judgment is present here. A decision adverse to TRW on either of these issues would compel this court to dismiss the case.

Res Judicata

The effect of res judicata is a bar to parties to a suit and their privies from relitigating a claim which has been the subject of a final judgment. Cromwell v. County of Sac, 94 U. S. 351 (1876). Res judicata does not, on the other hand, preclude one, not a party or privy, to a prior suit from relitigating the precise issues decided in arriving at a prior judgment. American Photocopy Equipment Co. v. Rovico, Inc., 257 F. Supp. 192, 150 USPQ 180 (N. D. Ill. 1966), aff'd. 384 F. 2d 813, 155 USPQ 119 (7th Cir. 1967), cert. den. 390 U. S. 945, 156 USPQ 720 (1968).

Ellipse does not contend that TRW was in any sense a "party" to the previous litigation, it does contend however that TRW was in "privity" with Ford and is therefore bound by the judgment. Privity has been defined in Bigelow v. Old Dominion Copper Mining and Smelting Co., 225 U. S. 111 (1912), as the "mutual or successive relationship to the same interest in property". Whatever this definition may mean it means something more than the relation which a manufacturer and his customer

have to the product sold, and therefore to each other. I. T. S. Rubber Co. v. Essex Rubber Co., 272 U. S. 429 (1926); Bros Inc. v. W. E. Grace Mfg. Co., 261 F. 2d 428, 119 USPQ 401 (5th Cir. 1958).

[1] Nor does the fact that TRW agreed to indemnify Ford against the judgment establish privity between Ford and TRW. I. T. S. Rubber Co. v. Essex Rubber Co., supra. Stripped of its verbiage Ellipse's argument boils down to the proposition that a manufacturer of an allegedly infringing article is bound under the doctrine of res judicata by a decision against one of its customers. This is not the law and rightly so. A manufacturer should not be bound by a decision against a customer, who may have no real interest in defending the suit.

The cases cited by Ellipse are wholly distinguishable on their facts. In each of these cases the party found to be in privity with the litigant was either the sole owner of the litigant, a subsequent purchaser of the litigant or its business assets, or a potential purchaser of the business assets of the litigant. See Hart Steel Co. v. Railroad Supply Co., 244 U. S. 294 (1916); J. R. Clark Company v. Jones & Laughlin Steel Corp., 288 F. 2d 279 (7th Cir. 1969); Brunswick Corporation v. Chrysler Corporation, 408 F. 2d 335, 161 USPQ 65 (7th Cir. 1969); Schnitger v. Canoga Electronics Corp., 462 F. 2d 628, 174 USPQ 321 (9th Cir. 1972). No such relationship is alleged to exist between TRW and Ford.

This court therefore holds that TRW is not bound under the doctrine of res judicata by the holding in Ellipse Corporation v. Ford Motor Company.

Justiciable Controversy

The plaintiff in this case has asked this court to do two things: First to find Claim 3 of the Rhine patent invalid and void; Second to stay all further proceedings in the accounting between

Ford and Ellipse. Whether this court has the power to grant this relief is the issue now to be considered.

[2] It is clearly established from the cases that one who is in the position of an alleged infringer need not sit idly by while a patentee harasses him or his customers with charges of patent infringement, threats of suit, or filing of a suit against a customer. The alleged infringer may bring an action for Declaratory Judgment asking that the patent be found invalid or non-infringed. Western Electric Co. Inc. v. Hammond, 135 F. 2d 283, 57 USPQ 203 (1st Cir. 1943); Sticker Industrial Supply Corp. v. Blaw-Knox Co., 367 F. 2d 744, 151 USPQ 443 (7th Cir. 1966); E. W. Bliss Company v. Cold Metal Products Company, 137 F. Supp. 676, 108 USPQ 47 (N. D. Ohio E. D. 1955).

The key difference between the above-cited cases and the present case is that in the cited cases a declaration of patent invalidity, together with injunctive relief where appropriate, would have the effect of relieving the plaintiff from the harassment complained of. In the present case no such simple relief is possible. The plaintiff would not only have this court find that Claim 3 of the patent is invalid, but would also have the accounting proceeding in Ellipse v. Ford stayed with an eye to eventually eliminating the pumps manufactured by TRW from that proceeding. Although this court has found that TRW is not bound by the judgment in Ellipse v. Ford, there is no question that this judgment is now res judicata as between Ford and Ellipse. Locklin v. Day-Glo Color Corp., 468 F. 2d 1359, 175 USPQ 453 (9th Cir. 1972).

This court has no authority, during the pendency of the accounting, to modify a judgment previously entered by this court which was affirmed on appeal and on which certiorari was denied. In re Potts, 166 U. S. 263 (1897). Such modification is what the plaintiff is really asking for. It is also quite clear that without staying the accounting and reopening the case

of Ellipse v. Ford, a finding of invalidity of the patent by this court at this time would be no more than an advisory opinion.

Although this court is of the opinion that it is without jurisdiction to entertain this suit, even if jurisdiction existed, the case is a proper one for dismissal. Whether to entertain a suit for Declaratory Judgment is always discretionary with the court. The issues involved here have been resolved in a case already pending, of which the plaintiff not only had knowledge but had observers at the trial and whose counsel appeared in the appeal. This case could only result in piecemeal trials which is a sufficient reason under Yellow Cab Co. v. City of Chicago, 186 F. 2d 946 (7th Cir. 1951), for the court to use its discretion to dismiss the complaint.

It is therefore ordered that this case be dismissed for the reasons set forth in this opinion.